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POLICEWOMEN WHO MOTOR CYCLE.

# THE MOTOR CYCLE

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AND CIRCULATES THROUGHOUT THE WORLD

No. 745. Vol. 19.

Thursday, July 5th, 1917.

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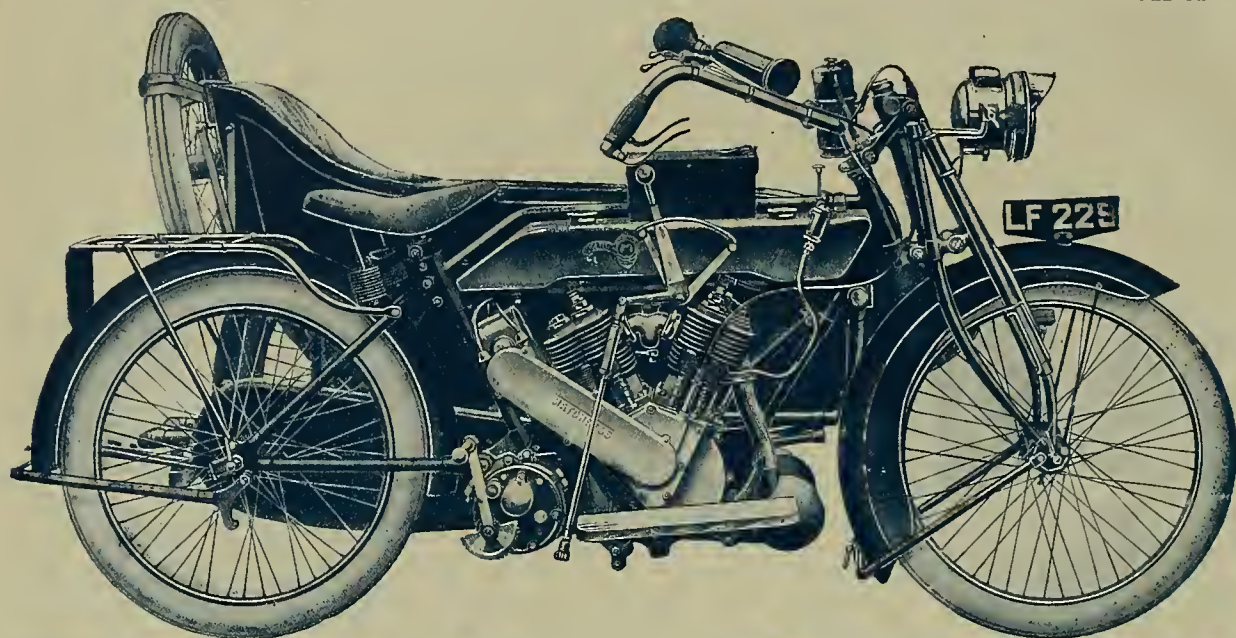
I might add that I got mine through your agent, Mr. Foster, St. Germans, Cornwall, and it has given me entire satisfaction, and it's very probable, after the war, I shall go in for one of your

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## A Step towards Economy.

**T**HE wastage of petrol by the employment of heavy vehicles when lighter and more economical machines could just as conveniently be used has long been painfully evident to anyone observing the traffic on any important road. Heavy touring cars, involving the time of drivers, have been freely used for the conveyance of single Government officials, and to many unfortunate motorists whose cars or cycles were of real business value, but who are prevented from using them owing to the all-prevailing order for economy, this lack of system has appeared as savouring strongly of injudiciousness. The Government rightly urges economy, so let us see the seeds of it in Government example.

That there is every need for conserving the petrol supplies can be fully appreciated when one contemplates the enormous demands of the Army and munition factories at home, but this demand could be considerably reduced if every opportunity were taken of using economical vehicles on all occasions possible, not only in the Army, but in the various other Government controlled branches.

Naturally the motor cycle affords the cheapest means of locomotion for one person, though its sphere of economical usefulness may not have been realised to the full.

We and our sister journals have dealt so often with this point that it comes as a real refresher to learn that the Petrol Control Committee have already set to work to enforce economy by advocating the employment of motor cycles for solo use. Government servants who hitherto have used cars have received the direct hint that a motor cycle would be adequate for their demands, and their supply of petrol has been fixed accordingly. We hope to see this excellent move followed up with even greater zeal by the new department, for at home the economy and efficiency of the motor cycle and the sidecar outfit are far from being fully utilised.

## Has a Rotary Engine Reciprocating Parts?

**W**E recently published two letters, the first of which stated that in a rotary engine the pistons did not reciprocate, but revolved round a given point, while the second asserted that the rotary engine was a reciprocating engine pure and simple. Both writers were perfectly right from their own point of view, but they looked at the matter from different standpoints. A third writer, whose letter we published last week, explained the apparent anomaly well when he pointed out that the rotary engine was a reciprocating engine in effect only.

For the benefit of our readers, it may be as well to amplify this statement a little. All motion as we can conceive it must be relative. (A man may be said to be sitting still when, as a matter of fact, he, the chair in which he is sitting, and the house in which he is, are all revolving about the axis of the earth at about 600 m.p.h. if he be in the neighbourhood of London, or something like 1,000 m.p.h. at the Equator, as well as being carried round the sun and through space at a very high velocity.) Motion, then, being relative, the movement of the pistons may be considered as being in relation to the cylinders, when it is reciprocating; or in relation to the whole engine, when it is circular, for the pistons revolve about the fixed big end. It is well to note, however, that the movement of the pistons, although in a circular path, is by no means uniform. The speed increases and decreases as in a non-rotating engine, though not to anything like the same extent, and there is no reversal of motion. In the case of an engine having connecting rods equal in length to four times the crank throw, the ratio of the fastest to the slowest speed, while the speed of the engine, of course, remains constant, is as five to three.

A further instalment of letters received since the above was written will be found in this issue.



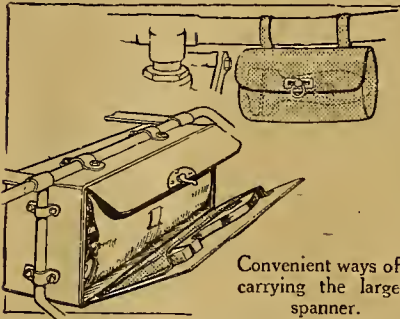
## IDEAS: Useful and Ingenious.

Sydney R. Jones.



## CARRYING THE LARGE SHIFTING SPANNER.

OF all tools the motor cyclist carries, the large shifting spanner is the one most frequently needed, and this massive piece of furniture is rolled up carefully or otherwise, according to the character of its owner. Its use generally means that the roll has to be spread out on the road or the saddle, causing a waste of time, and a chance of losing other tools when in a hurry.

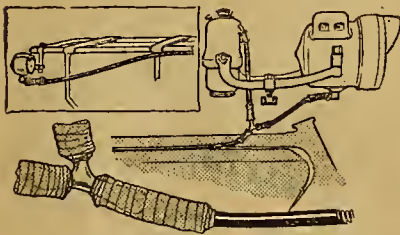


Convenient ways of carrying the large spanner.

A convenient place to carry a big spanner, which is at the same time quickly accessible, is in a pocket on the inside of the lid of the bag. Some makers have adopted this method, and fit this extra pocket as standard. An alternative method is to use an ordinary cycle tool case and carry it on the handle-bar. Of these ideas the writer thinks the separate carrier better, the pannier bag being usually locked.—DERBY T.T.

## BOWDEN CABLE FOR GAS TUBING.

THE outer part of a Bowden cable, when new and sound, can be used with satisfaction as gas tubing, provided it is of the covered variety. Care



Using Bowden cable as gas tubing.

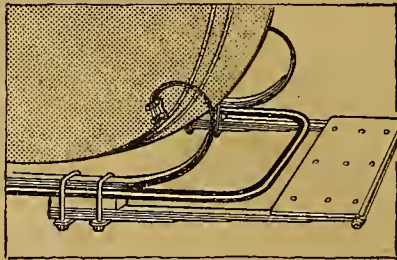
must be taken not to crack the waterproof covering; but there is no danger of the light being put out by the cable being nipped, as sometimes happens with small rubber tubes. The ends can be attached to the connections by the ever-useful insulating tape.—P.Q., Stockport.

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Rough sketches will suffice.

## A SPRING SIDECAR GRID.

EVERYONE who is accustomed to carrying luggage aboard a sidecar has experienced the numerous disadvantages which accompany the practice of attempting to support one's goods on a grid attached to the rigid frame. Not only is the terrific jolting injurious to the goods thus mounted, reducing a good leather suit case into a disreputable wreck in a very short space of time, but if the load be at all weighty very considerable breaking strain is imposed on the members that support it.

The advantages of a spring carrier are, however, so very obvious that there is no need to dwell further on this point,



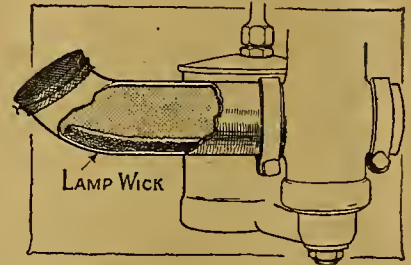
An improvised luggage grid made from sidecar springs.

and the following simple grid, though not, perhaps, luxuriously sprung, answers the purpose of affording a carrying space which is sufficiently insulated from severe shock to render unnecessary the use of yards of rope to prevent one's gear from slipping, and on which, incidentally, a couple of petrol tins can be mounted without danger of leakage caused by excessive jolting.

The sketch is, of course, self-explanatory. A couple of sidecar springs—the longer the better, though their length must be decided by their stiffness and the load to be carried—are fastened under the chassis frame in the usual manner, their protruding ends carrying the grid or platform. The springs should be given sufficient clearance from the frame by the insertion of packings at their points of attachment, otherwise they will rattle against the frame when progressing over pot-holes, while generally the spring clips at present in use can be utilised to secure them.—S.A., Leeds.

## PETROL SAVING DEVICE.

I HAD always thought a good deal of petrol must have been wasted in consequence of blow-back from the carburettor, and although I have put new springs on the inlet valve I have never really cured my engine of this fault. The running is not affected in any way—it was only the thought of wasting the precious fluid that bothered me.

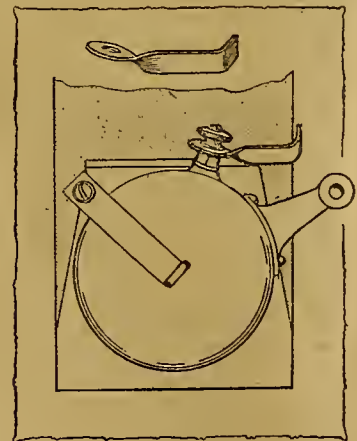


Extension pipe to air inlet to catch blow back.

Eventually I fixed an extension pipe to the air inlet, and placed a piece of lamp wick along the bottom, and a piece of gauze at the opening. The wick absorbs the petrol as it is blown back by the closing of the valve, and very little of the fuel wasted.—W.P., Glasgow.

## A SIMPLE CUT-OUT.

RETARD the spark fully. Take a piece of clock spring and drill a hole in it, then screw it down under the terminal on the contact breaker. Bend it so as to touch the magneto casing, as



A very simple method of making a cut-out.

shown in the sketch. This is very useful if the exhaust lifter cable breaks. By fully retarding the spark the engine is switched off.—G. F. JONES, Sheffield.





### Shock Absorbers.

“CHINOOK’S” sensible article unaccountably omitted one of the chief functions of a shock-absorber from a technical standpoint.

When a firm sells a machine to an amateur it is, humanly speaking, certain that on many occasions the engine will misfire or be guilty of false starts before it reaches the scrap heap. When its owners essay to start it, it will not infrequently fire once or twice, and then balk with a terrific jar; or it may misfire mildly for a hundred yards or so till it gets into its stride. Again, unless its owner is superhuman, it will from time to time misfire, and be allowed to continue misfiring on the stand or on the road for a little time, while the owner observes its misbehaviour in order to complete his diagnosis. On all these occasions the engine passes on a frightful jar to the transmission, which is more damaged thereby than through a hundred miles of smooth firing under load at medium r.p.m. It is further very probable that when a shock-absorber locks itself solid under such a shock, part of the jar is retransmitted back to the engine, and adds to the decay which the original shock initiated. It is, therefore, in the interests of both maker and user that any cushioning devices employed in the transmission should damp out these stresses as far as possible. The type of absorber, condemned by “Chinook,” which jams up solid after a sixth of a revolution or so, is obviously very ineffective under such circumstances.

### Underlining the Point.

IN our issue of June 21st “Cadet R.F.C.” bears interesting testimony to the oft-repeated theory that incandescent sparking plugs are responsible for 99% of “drying up,” or of the tired feeling which so often develops in an engine when it is driven hard. As he states his case without explaining it, I beg to underline his point in the interests of novices. He had charge of a W.D. Douglas in France, which ran itself to a standstill in half an hour of high speed. After many failures he cured it by filing off the side electrode of each sparking plug, and bending down the centre point till it was within striking distance of the edge of the plug head. Further improvement, though less appreciable, was obtained by fitting copper rain umbrellas under the cable terminals. The cognoscenti will understand the story at sight. May I explain to beginners that the side electrodes could not get rid of the heat imparted to them by successive explosions, consequently they became red hot, and fired the charge. When they were removed the only slender piece of metal capable of accepting more heat than it could conduct away was the central electrode; the rain umbrellas at the outside ends of these electrodes acted as radiating fins, got rid of some of the

heat, and so created a faster circulation of heat up the electrode, away from its tip. Thus the central electrode in its turn was cured of a tendency to get red hot. “Cadet R.F.C.” will soon learn, if he has not already discovered it, that there are modern British plugs which would have cured this engine straight off, and our more intelligent readers will remember that certain racing plugs have no side electrode in the true sense, but in lieu thereof have a slight outward cam-shaped bulge in the ring of their open heads.

### Sideslip.

OUR “Critics” tackled a very thorny subject the other week. The “manufacturer’s” dictum is that 50% of the responsibility for sideslip rests with the designer, and 50% with the rider. If he were comparing the motor cycles of, say, 1903 with those of to-day, his distribution of blame may be roughly accurate. In those days I was a very clumsy and inexperienced rider, and our machines resembled a giraffe with a steam hammer tied round its throat, the rider being comparable to a pigmy seated between the giraffe’s ears and steering it by a four-inch rein. Yet even in those days I managed to correct most of my skids, and those in counties where the treachery of the local grease is still a public byword. But turning to modern days, I would go so far as to say that any decent rider can hold up practically any modern machine on all British grease. If anybody wants to make a simple test of the personal factor, let him take out his machine, deflate his back tyre to a zero pressure, and try to ride the jigger in that condition. There are plenty of riders who would drive a modern machine at legal limit with a flat back tyre for as long as you made it worth their while. I have seen it done over and over again when necessity demanded, chiefly in six day trials, when a puncture occurred near the end of a timed road section, and a stop to repair on the near side of the control implied a loss of marks. On the other hand, the average rider could not cover a mile on the Bath Road with a flat back tyre without wobbling from hedge to hedge, and falling off every now and then. The test illustrates a man’s knack of controlling a machine which is not easily steered and balanced, and I think the illustration is sufficient to prove how much depends on the rider. Nerve, tyres, handle-bars, centre of gravity, steering angle, wheelbase length, even torque, and a smooth drive all help, but a decent rider on a vilely-designed machine will very rarely get unsaddled by a skid, except when he is caught off his guard, whereas a duffer will come a cropper at the faintest excuse on the best machine in the world, but this type of rider is nearly always in trouble of some kind!



# POLICEWOMEN

## WHO

## MOTOR

## CYCLE

By  
ONE OF THEM



WE never dreamt of motor cycling until three months ago. We had only once seen a woman on a motor cycle near Lewes, and we thought her a wonder. We ourselves were content to confine our motor experiences to such steady-going cars as a Singer, a Hillman, or a Ford. Most of the policewomen can manage Fords, as they are the staple car of the munition factory, but Fords need more petrol than motor cycles, and when we made an application for petrol licences for our work we were given the reply which I understand is now universal—*"This officer is recommended to try a motor cycle."* As our need for quick locomotion was increasing as rapidly as the petrol supply seemed decreasing, we determined to take the Petrol Committee's advice seriously and make the experiment.

We now think we owe them a debt of gratitude, for not only are we ensured a "mount" for any emergency and for any distance, but we have entered into a new "sport" more exhilarating and refreshing and exciting than any we have previously gone in for. We all think a ride which presents problems of hill-climbing, traffic threading, or (this must be whispered, for, be it remembered, we are policewomen!) pace-making, beats the joys of skating, skiing, shooting, tennis, boating, or hunting, which we once thought unsurpassable.

Now for a few words about our mounts. None of us had motor cycling friends, so we had to make our own choice. And we had no knowledge whatever, only the memory of a sound—the sound of a purring engine. I expect the grand mechanical readers will smile at the queer way women set about things, but we wanted motor cycles with a sound like the one we remembered. We know nothing of names or makers, but we found our sound twice over, in the Levis and the Enfield, and we have since learnt to recognise the note as the unmistakable purr of the two-stroke engine. We couldn't have two motor cycles each, so we had to choose between them, and chose the Enfield. This was because we were aspiring to the Enfield 3 h.p. twin to go on with, and one of us is going still further to the 6 h.p. twin with a sidecar.

Our work takes us through some rough country and roads, which come near those at the Front for pot-holes. My mileometer registers 1,860, and my colleagues' are not far off. We have tackled most of the Kentish hills, and the little lightweight sings gaily "on top" up such tests as Westerham, Saunderead, Goudhurst, Detling, etc. One of the most difficult hills we have found is the Sevenoaks Hill on the road to Tonbridge. We tried that two or three times, and had always to stop in the middle before we remembered some advice given in

*This officer is recommended  
to try a motor cycle*

Petrol Control Committee.

Official acknowledgment of the economy of the motor cycle. Congratulations to the P.C.C. on this first practical demonstration of a possible solution of the petrol difficulty!

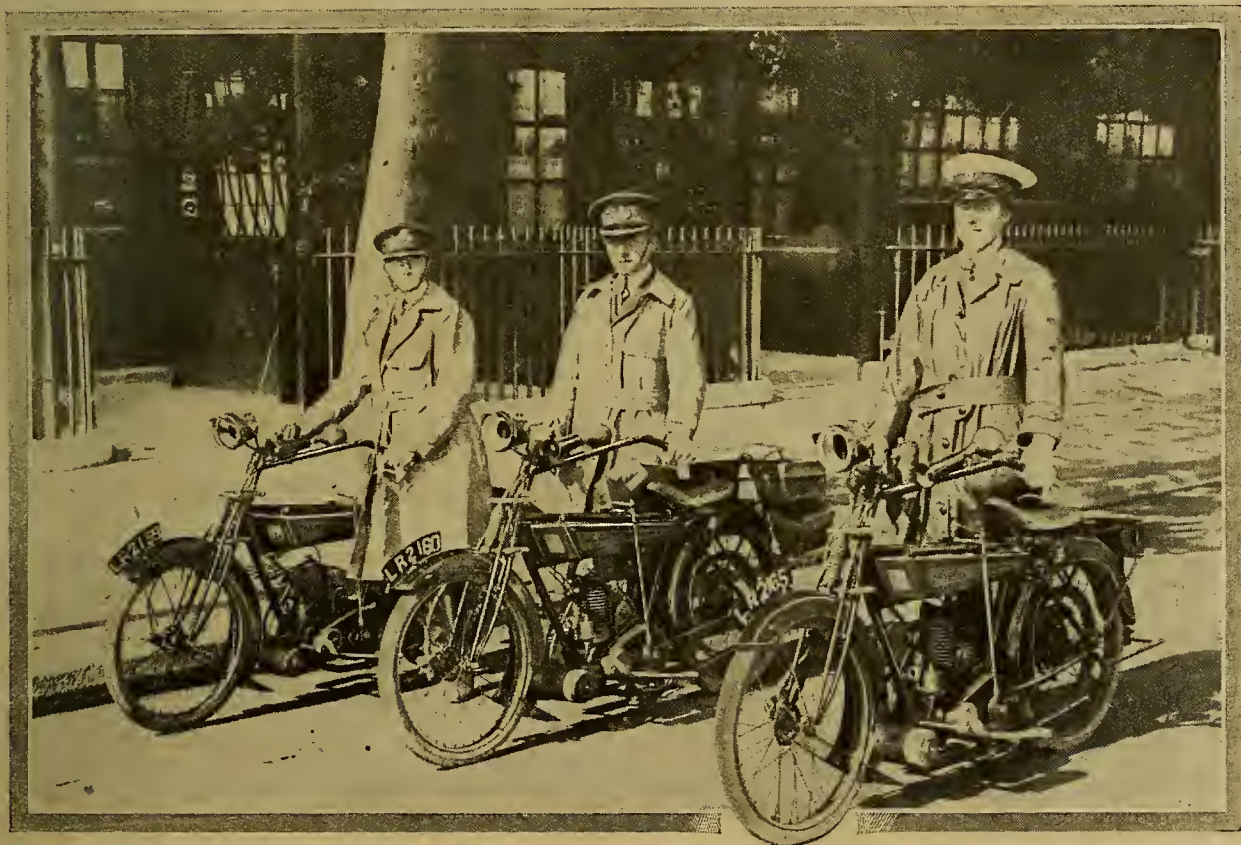


**Policewomen who Motor Cycle.—**

"Hints and Tips to Motor Cyclists," a most helpful friend to the beginner, in which the writer advises the would-be hill-climber with a single gear to smoke a pipe at the foot and have a good think while the engine rests and cools!

We did that—minus the pipe—at the foot of Sevenoaks Hill with the result that our two machines sailed up with a high-note hum, and passed all our brother-wheels on the way. One Flying Corps man with a heavy-looking mount and sidecar, struggling up with an awful noise and rattling valves, was quite cross with us, and said, "There are

pieces of flint or glass forcing their way through the old wound and so damaging the new tube. Another thing we always bear in mind is not to emulate our brethren in mechanical experiments—in other words, not to tinker with our engines. If we are satisfied that our engines are thoroughly cleaned—and with a petrol system such as the Enfield, one's whole comfort depends on scrupulous purification of the carburetter—if the sparking plug seems happy and the pace a gay twenty-five miles an hour with no funking or spitting when hills are reached, *then*, with such conditions, one need enter upon no elaborations of extra air inlet or fancy sparking gaps, etc.



We live in an age which is not easily moved from its nonchalant attitude by even the most unorthodox innovation, but to some it may be an indication of the changing times to learn that we now have motor cycle policewomen inspectors of the munition areas.

women everywhere," but we told him to cheer up, as it was not we, but the lightweights that did the trick, and we vaunted the Ministry of Munitions over the War Office in the matter of mounts—but perhaps that last wasn't fair of us!

**A Lady's Sound Advice.**

Bar a couple of punctures on a road covered with black flints with razor edges, we have not had one trouble. But, as we wasted a lot of time over those punctures, may we pass on what may be a helping hint to our motor cycling sisters—carry a butt-ended inner tube, and if you puncture near the join of your inner tube do not attempt to patch it, but change the tube and do not forget to stick a good patch of canvas inside the outer tyre to prevent small

These little lightweights are extremely sensitive, very docile if gently handled, very easily upset, and most troublesome when once upset. I met a most distressed and grimy young man some weeks back; he was labouring along on a smoking and spitting lightweight which seemed to be oozing oil and smoke at every pore. He looked enviously at our trim and sparkling mounts, and said he was trying a new kind of magneto. It was a very technical description, and it was not what the maker of the cycle had intended him to have. I could not understand his explanation, but I did understand that we were going to have a lovely ride, and that he, poor thing, was in, for a rotten time.

Ah! One word about clothes—a most important subject to us and our sister riders. In our opinion



### Policewomen who Motor Cycle.—

the "eternal feminine" is no good for motor cycling. We were told by our "brethren" that riding in a skirt was "quite comfortable," but we soon proved the contrary. To ride in comfort, to be able to sit down by the roadside and tackle "running repairs" to lessen the contraction of sitting still for a long time, one must be free to jump off or jump on without the restraint which the skirt, however well cut, imposes. In uniform we find top boots and long riding coat give the most "official" effect.

For riding in plain clothes we have the ordinary mackintosh coat, corduroy breeches, boots, and gaiters. The corduroy we have chosen as being durable, warm, yet not too hot or heavy. Messrs. Selfridge have designed us a very comfortable loose cloth cap which entirely covers the hair, keeps out dust, and does not blow off. The usual disclaimer, please, for this last information.



The policewoman must be able to undertake roadside repairs, and the photograph shows a driver of an Enfield two-stroke busy effecting some minor adjustment.

## The Wearing Qualities of All-chain Drive.

### The Experience of a Clyno Owner using Totally Enclosed Chains.

IN the issue of *The Motor Cycle* for June 7th a short article appeared discussing the merits and demerits of the two systems of drive in common use at the present time. In this connection the experience of one who has used an all-chain-driven sidecar between 28,000 and 29,000 miles may be worthy of note. The sidecar in question is a 6 h.p. Clyno 1914 model, which has been directly under our observation for over twelve months. It has recently been dismantled with a view to a complete overhaul, including re-enamelling and plating. By reason of war work occupying all modern factories, the whole of the work, except the plating, had, perforce, to be undertaken at home. Every part has been carefully scrutinised during the dismantling process for defects or signs of wear, and a pleasing fact is revealed that very few replacements have been found necessary.

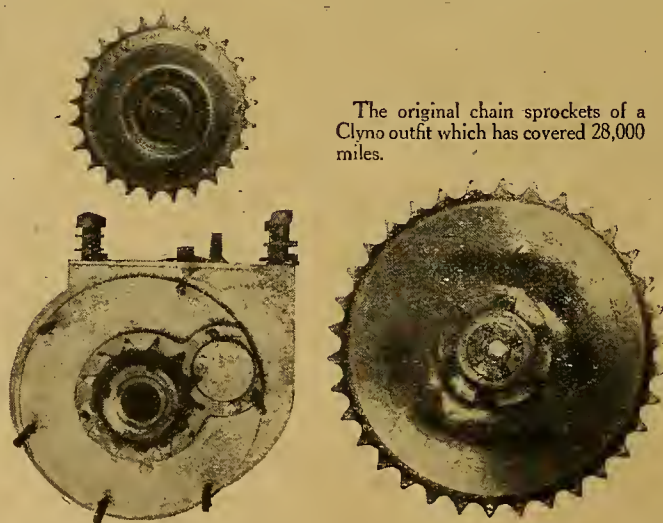
Regarding the transmission, it was fully expected that new chain sprockets would be required, but the wear was found to be so little that new ones were

quite unnecessary. The photographs show how little the teeth of the sprockets have suffered, the large one being in specially fine condition. The present chain, which is as new, has served for 12,000 miles, and is the production of the Coventry Chain Co., Ltd., the original one supplied with the machine having been accidentally broken.

The whole secret of the splendid wearing qualities of this transmission is that, in addition to the excellent and suitable quality of the materials used, the drive is totally enclosed in oil and dustproof cast aluminium chain cases.

The above facts help to prove that chain drive, under favourable conditions, has almost unlimited wear, and it may be pointed out that the above machine is not fitted with a shock absorbing device, though, of course, the clutch

has been judiciously used. Except at very low top gear speeds, the engine pulls perfectly smoothly. Beyond cleaning out for the purpose of inspection, the gear box, too, was found to require no attention, its condition indeed was magnificent—truly a fine record.



The original chain sprockets of a Clyno outfit which has covered 28,000 miles.



# THE Critic

## Fireside Chats on Motor Cycle Problems

### INVERTED CONTROL LEVERS AND ENCLOSED WIRES

AS usual the Novice kicked off. He said: "I don't know whether you fellows noticed a short article in *The Motor Cycle* last week in which a writer denounces inverted levers and obscured wires as a veritable *bête noire*. If so, what's your opinion? It seems to me that the matter of handle-bar levers is an important problem."

All of them had read the article. The Manufacturer expressed surprise that a writer who appeared normally to have an average share of sound judgment should possess such unusual tastes and depart so entirely from the policy of his paper. "Here, for years past," he pointed out, "we have been striving to obtain neat and unobtrusive controls, then 'Chinook' goes and damns everything!"

"I must say that they struck me as most extraordinary views," the Journalist added. "If the writer under discussion prefers the spiky variety of controls let him have them. There is no need to attempt to divert the minds of others from the obvious and ordinary style of things."

#### Opinions Differ.

The D.R. laid down his pipe, and, with an air of fixed determination, regarded the Journalist and the Manufacturer. "I agree absolutely and unflinchingly with 'Chinook,'" he stated. "I have regarded the inverted lever and the inside wire as a positive menace ever since pedal cycle days. I have had enough of them to last me a lifetime."

"The same here," stated the Novice. "My mechanic charges sixpence a time for repairing an ordinary outside wire, but he charges one-and-six a time for repairing the inside wires of my machine. That conveys some idea as to the respective accessibility of the two methods."

The Manufacturer agreed that the outside controls were perhaps a little more accessible than the inside variety, but qualified his statement by adding that this was because so few riders knew how to handle the inside wire. "A rider with any sense objects to a multitude of spiky levers," he added, "and to converting his handle-bars into a veritable *chevaux de frise*."

"He's got to have the levers anyway," retorted the D.R., "and I fail to see why, because they are outside, they should be unduly spiky and aggressive. True that the average clutch lever sticks out in a nasty way, but there is positively no reason why it should. The amount of lift need not be anything like that allowed by these wide-angle levers,

which are difficult to get hold of. They would be more comfortable and give better leverage if designed on the lines of the ordinary inverted lever—that is, the lever normally lying almost parallel with the bar."

#### Lubrication and Weatherproofness.

"You cannot have outside levers and outside wires without crowding up your bars," the Manufacturer pointed out. "There is nothing neat about the arrangement, and the sight of such a jumble of levers is enough to frighten a novice off any one make of machine. Besides all this, I consider the outside lever dangerous, as if you ran into anyone with a machine so fitted the lever could very easily inflict a fatal wound. As for the wires, an enclosed wire is neat, out of the way, and protected from damage."

"Certainly, and if your outside lever must protrude from the bars almost at right angles, it is dangerous," snorted the Novice; "but surely that is not a necessary point in their design?"

"Another point," broke in the D.R. "Talking about danger, there is this point to consider. We must have three Bowden levers—brake, exhaust lifter, and clutch—so that one of them (the clutch) must be on the outside. There is, therefore, a very real danger of the clutch being rendered suddenly inoperative should it shift its position so that it fouls the inverted control. On one or two occasions I have very nearly collided with lorries through this happening, and once, indeed, I got my hand imprisoned between the open control and the inverted. Very nice, I can tell you!"

"It is hardly fair to blame the inverted lever because the open control may slip out of position," said the Journalist. "Moreover, can you tell me why so many leading makers choose the inverted lever and the inside control?"

"Yes," answered the D.R.; "because it is neater, and looks clean and simple."

"Also for protection," answered the Journalist. "By having the wires inside you protect them from damage and from the weather."

"Here, again, I do not agree," replied the D.R. "As regards damage, the only point where the wires need protection is in passing through the spring forks, and the inside variety has no more protection at this point than the outside. In fact, the outside wires are more easily guided out of harm's way, for by having plenty of slack you can arrange them in a wide curve quite clear of the forks, and, what is more to the point, quite free from kinks."

"Hear, hear!" muttered the Novice. "Then, as concerns weatherproofness, I fail to see the object of concealing only one foot of the cable throughout its entire length. It merely means that you cannot oil the end of the wire where oil is most needed. I have known moisture to follow the trend of the wire into the bars, with the result that rust sets in along the obscured length. Next, one or two strands break, till, after working stiffly for some time, the wire finally gives out. Thus the inside wire is more likely to break than the outside, and it is more difficult to mend when it *does* break."

"You are certainly trying to make the best of your case," observed the Journalist, "but your remarks contradict themselves. If moisture will follow the trend of the wire, oil will most certainly do the same, and, what is more, if the oil is given the first chance, it will to a large extent prevent the water from following. My business hack has inside wires. Only once has one of them broken during three years of all-weather riding; then it was a matter of only a few minutes to slip in a new wire."

#### Accessibility.

"Just my point," the Manufacturer backed him up. "Inside wires and inverted controls normally give so little trouble that it is not worth while putting up with the ugliness and clumsiness of all outside controls to eliminate it. How often do you experience wire troubles in these days? Not till the machine has seen two seasons' use."

"Exactly so," agreed the D.R. "It is because the inverted control has to be taken adrift comparatively seldom that one can confidently expect to find it permanently rusted into the bars when finally it *does* have to come out. That's when the fun begins. The day inevitably comes when the sockets have to come out. Either you want to change the bars, or to put new cones in the steering head, or possibly you want to reverse the controls. Any of these things can be done in a few minutes if all the controls are outside. If they are inside, it is a full evening's work—if all goes well."

"I deny this entirely," said the Journalist. "You unscrew and detach your handle-bar lever, I slip the exhaust lifter wire from the engine, and allow the wire to come away with the handle-bars—a matter of a moment only, and it can be done without removing screws. The same thing can be done with the front brake."

"What are your two inverted controls?" queried the Manufacturer. "The



### The Critics.—

exhaust valve lifter and the brake, both of which you use so seldom that the wires last indefinitely. In these days we use our carburettor controls instead of the exhaust valve."

### How Wires are Broken.

The D.R. thumped the table. "Look here," he said; "exhaust valve wires are more likely to be broken to-day than in the days when they were used as controls, and for this reason—because we use them in conjunction with the kick starter when the engine is stationary. This means that the wire is often used to haul up the valve against the spring, whereas, when the engine is turning over, the tappet lifts the valve, and the wire has merely to anchor it up. It is in starting that the wires are generally broken by people hauling on them, and you cannot deny that the outside variety are infinitely easier to repair than the inside."

The Journalist appeared thoughtful. "There are yet two other reasons why I prefer the inverted," he stated. "They give you something to hold on, so as to rest your wrists, and, besides making the handle-bars neater, they render them much easier to clean. You talk about

protection—well, the point at which protection is most needed is on the bars themselves, where the cables are apt to foul the sharp edges of the horn and lamp brackets. If the bars are clear of outside wires, there is no trouble in arranging other fittings, whereas if the whole thing is tangled up with wires, the fittings and the wires all get in each other's way, and after a week or two one finds the waterproof covering of the wires cut through—probably in three or four places."

"There is certainly something in your latter argument," agreed the Novice, "but your first is weak, because you can buy buffalo horn grips which give you just as comfortable a hook to hang on to."

"As comfortable perhaps, but not so strong," put in the Journalist.

"And there is yet another point," concluded the D.R. "What about weakening the handle-bars by drilling them?"

### A Weak Point.

"Drilling is not necessary when bars are designed for inside controls," argued the Manufacturer. "What, when you leave your machine at a garage or at some other place—stacked with other machines

—as you so often have to do? The garage boy packs another machine side by side with yours, and in drawing it back on to its stand, one of its levers catches one of your outside wires, snatching round the bars and probably permanently kinking the wire."

"They don't catch in mine," retorted the D.R., "because I keep them neatly clipped to the bars—not slopping about in all directions. My bars are as neat as any you can see."

### Neatness Counts.

"Still, it is absurd to argue that an exposed cable is no more susceptible to damage than an unexposed," said the Manufacturer. "On one side we have incomparable neatness and protection. On the other we have accessibility. The rider who prefers all outside wires can get them. It is not for the manufacturer to choose a slovenly method in preference to a tidy one. The inverted lever is commendable because the little extra trouble it may occasionally give is fully warranted by its neatness and simplicity."

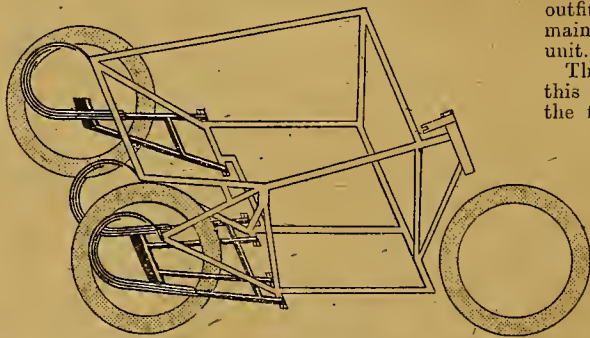
"And because," sighed the Novice, "it teaches patience, perseverance, and control of one's temper. Every man to his own choice."

## Another One-piece Sidecar Outfit.

A DESIGN FROM SOUTH AFRICA.

THE arrangement here illustrated hails from Natal, and appears to be another effort in the direction of the sidecar outfit built as a one-piece structure. The illustration is self-explanatory, but a brief description will perhaps prevent the reader from misconception.

The framework may be said to consist of three parts—the main rigid structure, which carries the engine, passengers, etc., and the two shaded members, which function respectively to support the two rear wheels. These shaded members, it will be seen, consist of swing brackets, at one end of which the wheel is mounted, while the other end is pivoted to the main frame, so that they can swing on their pivots in a vertical plane independently of the main frame. In the case of the driving wheel, two leaf springs, one on either side of the wheel, are placed between



A patented design in which the motor cycle and sidecar frame are one structure.

the unsprung brackets and the main frame, so that the weight of the main frame is supported on these springs; while in the case of the sidecar wheel one spring functions in the same manner. Thus we have all three wheels of the

outfit independently sprung, while the main structure consists of one rigid unit.

There are perhaps numerous points in this design which indicate weakness. In the first place it is not quite clear why the inventor chooses to mount his heavy springs as unsprung weight when they might just as conveniently travel as sprung weight. The driving wheel bracket appears at first glance to be efficient, but while its strength in one direction is in excess of requirements, the vertical rigidity of the wheel is almost entirely dependent on the short length of tube extending parallel with the spindle and between the two pivots. Any tendency on the part of the wheel to move out of the vertical would impose an enormous bending stress on this short tube member. There are other points, such as complicated brazed junction lugs, while the construction is not on scientific lines.

## Attachments to the Handle-bars.

VERY often considerable difficulty is experienced in inducing such articles as the horn or controls to retain their upright position on the polished bars, a strip of thin leather being the remedy generally resorted to prevent the usual slip. But even with the leather packing a certain amount of creeping generally takes place, and soon an all-round straightening up is necessary. In order to save oneself the trouble

and irritation which the insecure attachment of the handle-bar accessories so often occasions, it is a good plan to smear the piece of leather used on both sides with seccotine. It will then hold firmly to the polished surface; and an attachment made in this way, and pulled up tightly ere the seccotine sets, very seldom needs further attention. Probably one of the cements which are impervious to moisture, and which are made specially

for such jobs, would prove better than seccotine, which, however, I have found to answer well. Where a little scratching does not matter, a powerful grip can be obtained by folding a strip of emery cloth round the member clasped, tightening the clip on to the emery. This tip often proved valuable in the days when engines were merely clipped to a single frame member, round which they were prone to swivel.—S.B.



# SINGLE LEVER CARBURETTERS.

A Practical Test of Three Types. The Results obtained on a Single, a Twin, and a Four-cylinder Engine.

THE rudiments of carburation are little known to the average motor cyclist for the reason that the majority of machines are fitted with two lever carburetters, while the car type is in its infancy as far as motor cycles are concerned owing to its high price and the time taken in tuning. Yet a simplified method of control for the benefit of novices is urged in many quarters, and a single lever carburetter would help to popularise motor cycles. The writer has recently carried out experiments with the Claudel-Hobson, the Zenith, and the S.U. on singles, twins, and four-cylinder machines with most interesting and instructive results. Some notes on the design and a record of the results achieved are appended.

## The S.U.

The S.U. carburetter is extremely sound in principle, for both the air and petrol are governed by the suction of the engine. It was found, however, that on the singles it was not quite a success, as the intermittent suction had a detrimental effect on the air piston; the engine was slow to pick up and had no reserve power at slow speeds, although the results were good above 25 m.p.h. The twin was able to tick round in low gear so slowly that the machine was hard to balance as a solo mount, while the acceleration showed a marked improvement over that obtained on the singles; there was plenty of power, and consumption was quite good.

When fitted to the four-cylinder the result was still further improved, as might have been expected; slow running was excellent, both under load and with free engine; the acceleration was rapid and good power was

obtained, especially when labouring up a hill on top gear. The petrol consumption worked out rather higher than on the twin, but that must be expected on a four-cylinder of the same capacity; what was

noticed, however, was a marked improvement with regard to drying up—which was felt at times on the twin, especially in quick throttle opening. Altogether the result was particularly good on the last machine, which shows that this carburetter requires an even suction to stop fluctuations of the air piston.

The principle of the automatically variable jet is worthy of great praise, and the only thing which is missing is a stop to prevent the throttle closing so as to ensure slow running, but a fitment was easily made

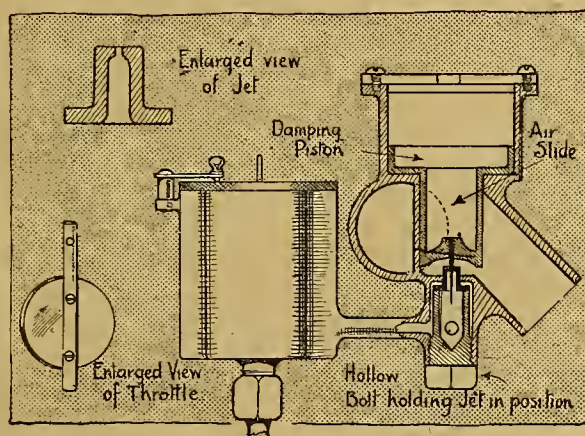
which proved very successful. A hot air pipe is absolutely essential to obtain good results.

## The Claudel-Hobson.

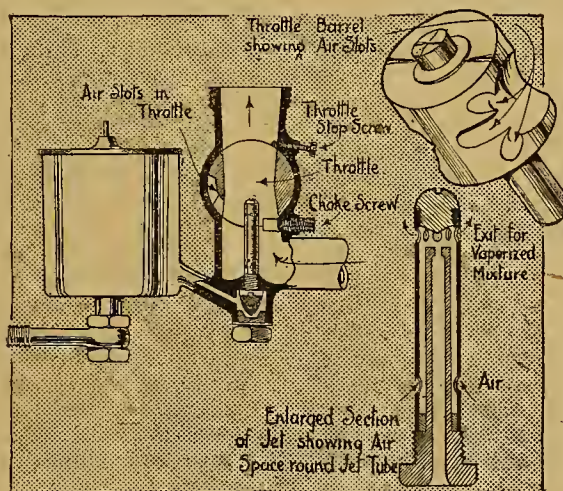
The Claudel-Hobson was the next on test. Fitting was made rather difficult by the vertical opening but was successfully performed, being simplified to some extent by the semi-universal joint for the petrol pipe.

This carburetter is quite different from the usual type of single lever. The air is governed by the slots in the throttle, and the jet is a great help to vaporisation owing to the unconventional design. Simplicity is the hall-mark, and there is only one moving part, viz., the throttle. No pilot jet or by-pass is fitted, but slow running is accomplished by a small stop screw situated in the throttle housing which prevents the throttle from closing.

The suitability of this carburetter for practically any machine is noteworthy, while for a twin the result is beyond



The S.U. carburetter.



Claudel-Hobson carburetter in part section.



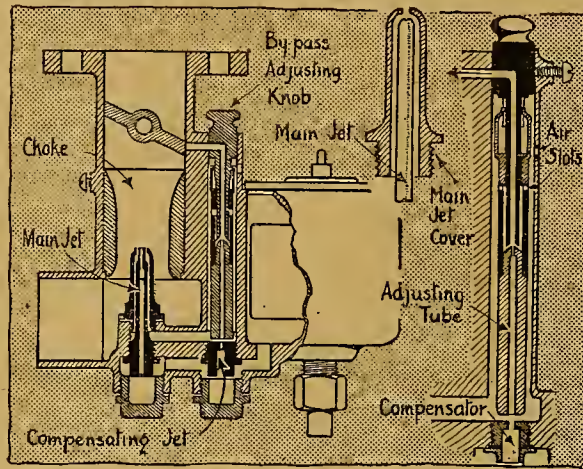
### Single Lever Carburetters.—

praise. A remarkably slow tick-over and a violent acceleration are its prominent features, both on a twin and four-cylinder engine.

In adjusting, it is necessary to remember the variable choke screw, as this more than all governs the ultimate running, and when tuning for the best results it is advisable to use a slightly larger jet with the choke screw nearly out, as this gives a larger reserve of power when the throttle is nearly fully open. The absolute necessity of fitting a hot air intake is apparent, for the carburetter is not at its best until well warmed up, but a few hundred yards in bottom gear will do this and smooth running will result. In conclusion, it must be borne in mind that the carburetter must not be too big for the engine, as, in that case, the results may be disappointing. A 16 mm. choke is quite big enough for a 5 h.p. twin or a 2 $\frac{3}{4}$  h.p. single.

### Zenith.

The Zenith carburetter has a great name in the car world. It strikes a motor cyclist as being somewhat complicated in design owing to the compensating jet for slow running, but the principle can be quickly mastered. In test the horizontal type was not a success, but the vertical model is perfect owing to the ease with which a hot air pipe may be fitted to the cylinder fins. The effect was good all round on the single—slow running, moderate acceleration, and plenty of power, while the consumption was low. The twin gave similar results, but the even suction was accompanied by better acceleration. The fitting on the four-cylinder necessitated an elbow, but there was a marked improvement over the two-lever carburetter,



The Zenith carburetter, showing compensating jet at right.

and the r.p.m. could almost be counted when running on a properly adjusted pilot jet, while a speed of more than the legal limit was obtained, enabling hills to be rushed "on top" with a heavy sidecar. The "pick up" was surprising, and it was possible to accelerate from a slow crawl in traffic to well over 20 m.p.h. in the matter of a few yards. The consumption was very low considering the heavy weight of the combination.

In fine, the carburetter is ideal for heavy touring on practically any make of machine. It is extremely well made, and every detail has had great attention paid to it, while a large stock of fittings, such as elbow bends and jets, are kept in stock by the makers, who will carry out adjustments to any purchaser's machine and give advice as to the size of jets, chokes, and compensators needed.

### Impressions.

When the good old times of peace come again with the trials and speed events, the single-lever carburetter will, *me judice*, become more widely used than at present. for our American cousins have not been slow to see the utility and superior excellence of this instrument, and with its twist grip controls the automatic carburetter is ideal. We get nearer the car every day with our dynamo lighting sets, detachable wheels, comfortable sidecars, and reliable engines. Why, then, not go one further by fitting a car type of carburetter which allows a slow tick-over, a fierce and rapid acceleration, which so far has been somewhat of a myth. Practically the design of the two-lever carburetter has not changed during the past six years, while the engine and transmission have forged ahead with wonderful rapidity. D.W.

## The Next A.C.U. Trial.

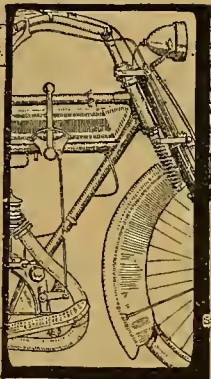
PEACE rumours have not of late been persistent, yet to the ardent motor cyclist the very thought that the war must some day end brings anticipations of the next Six Days Trial. I suppose its most prominent feature will be the many missing faces of those once formidable in such events, and now resting beneath an alien and blood-stained sod. When we have paid silent tribute to these gallant memories, our mechanical instincts will reassert themselves, and we shall find much that is new to interest us. The baby two-stroke should be there in fleets, and I question whether it will stand up as well under a week's stern testing as some of its devotees expect. Then the big multi-cylinder two-strokes will make their competition *début*, so far as serious work is concerned. I wonder how many of them will venture to turn out with sidecars attached. If any of them can get through a week of freak hills under double load, there will be

"some" boom in them. Possibly the lilliputian four-stroke may figure in the list; and, above all, the spring frames will attract universal interest wherever the trial goes. I don't suppose the trial will spell huge enjoyment for the participants, whether riders or officials. The function of a trial is to prove to the public the general level of efficiency, and to differentiate between those machines which touch a reasonable level. The first function will be fulfilled by the vast bulk of the machines ascending all the test hills and scoring practically full reliability marks. The necessity of emphasising the second function will burden the week with a long series of scientific tests, acceleration, and the like, which will entail a lot of hanging about and anxiety for the competitors and officials. One really regrets the old "all-in" trials, where it was simply a matter of finishing somehow; it is a pity that the growing perfection of our mounts has bidden those days an inevitable farewell. ROAD RIDER.



## ALUMINIUM AND AIR-COOLING.

Some Historical Facts concerning its Adaptation to Air-cooled Motor Cycle Engines.



**"The Motor Cycle's" Discovery of Patents dated 1897 and 1898 covering the Use of Aluminium for Cooling Purposes.**

**A**N informative article dealing with the subject of the uses of aluminium alloy in air-cooled engines appeared in *The Motor Cycle* of June 21st. The several alternatives were illustrated, and their advantages and disadvantages discussed by Mr. Georges Funck, A.M.I.A.E., with whom we had collaborated in the preparation of the article. Our particular interest in the use of aluminium alloy for air-cooled motor cycle engines has been made very clear on a number of occasions, and our investigations and study of the subject have led us to a discovery. It is generally supposed that the use of aluminium alloy in air-cooled engines is something quite new, but, as a matter of fact, the reverse is the case, the patent files proving once again the old adage that "there is nothing new under the sun."

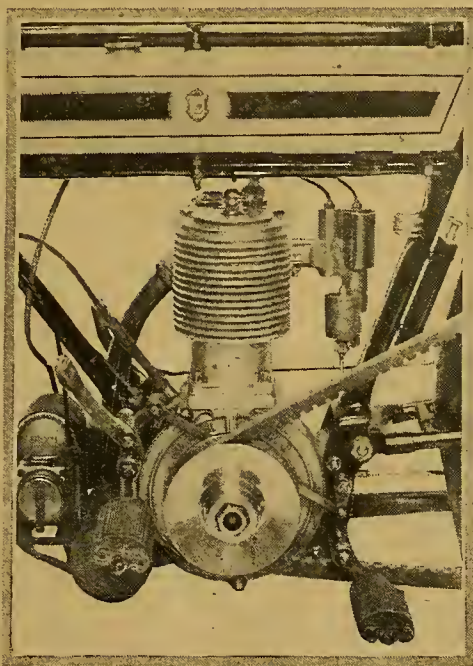
### Forestalled!

It was mentioned in the previous article that Mr. H. H. Wardle (whose provisional patent of 1914 we referred to as well as his experiments with an aluminium encased cylinder on a Triumph motor bicycle) did not complete his patent, and, being interested in this early recognition of the possibilities for the aluminium alloy cylinder—particularly in view of latter-day developments—we sought out Mr. Wardle at the Reliance Foundry, Coventry, in order to hear his experiences and impressions of the use of aluminium on a motor bicycle engine. Incidentally, we enquired why his patent was not proceeded with, since war-time developments on aeroplane engines have demonstrated that such a patent might have been worth annually many thousands of pounds. Mr. Wardle was good enough to show us the original cylinder casting he had tested on his Triumph motor cycle, and it is a very neat job, though considerable difficulty was experienced in the casting process, due to the

projecting valve chambers. The patterns, indeed, cost £30 to produce. Mr. Wardle confided to us that he did not go ahead with his patent for the very good reason that he was advised by his patent agent that a strong patent was impossible, as a patent already existed, dated 1898, covering "the use of a metal, for cooling purposes, having a higher conductivity than the metal of which the tube or cylinder itself is composed." Of this, more anon.

### The Usual Cold Reception

Before the investigation was complete, however, Mr. Wardle offered his patent to different motor cycle firms, who, not knowing of the snag that Mr. Wardle was later to encounter, sad to relate, gave it a cold reception, and eventually the outbreak of war put an end to Mr. Wardle's further efforts. When the patent search revealed a prior claim, his provisional patent was allowed to lapse. As to his experiences with a  $3\frac{1}{2}$  h.p. Triumph, Mr. Wardle spoke highly of the improved results obtained. The cooling effect of the aluminium jacket was so pronounced that, when running along the road, it was easily possible to hold one's hand on the fins. He proved, too, the remarkable economy effected in the use of lubricating oil, one-third the amount formerly used being found sufficient. Compression was maintained indefinitely, the valves and their seatings keeping in good condition and hardly ever requiring attention. Another significant fact was that, when the cylinder was dismantled for the removal of carbon, the deposit was found to be wet as in the case of water-cooled engines and easily removable. We illustrate Mr. Wardle's Triumph engine with its aluminium encased cylinder. The cylinder and crank case were polished, giving a very pleasing result, the engine being not only neater in appearance but lighter look-



**ALMOST AN ALUMINIUM ENGINE.**

The cylinder of this motor cycle engine has a covering of aluminium, including the cooling fins. It is polished to match the crank case.



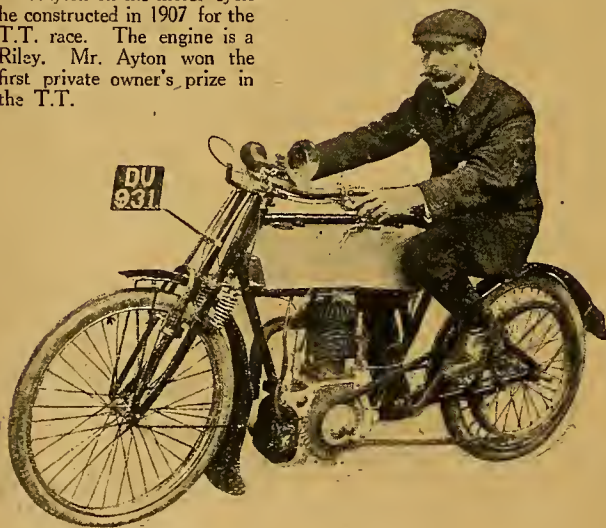
### Aluminium and Air-cooling.—

ing, as well as lighter in reality. In his original experiment Mr. Wardle took an ordinary Triumph cylinder and chipped off the fins, so that he had a plain barrel. This barrel was utilised in the casting process as the core, whilst a special wood pattern was made and the aluminium run round to form fins to the depth of the original cast iron fins. With a two-stroke engine the casting would not present such real difficulties, and in view of the higher temperatures generated by two-stroke engines, a cylinder of the type in question should prove particularly attractive to designers anxious to obtain the utmost efficiency. Now, the more usual course in aeroplane engine construction is to provide an aluminium cylinder shrunk over a thin cast iron or steel liner. Sometimes the aluminium casing envelops only the barrel of the cylinder, *i.e.*, a detachable head being used. In other cases the entire cylinder casing is composed of aluminium, shrunk into position on the liner.

### Activities Twenty Years Ago.

To revert to the earliest efforts in this connection, investigations undertaken by *The Motor Cycle* enable us to announce that one of the first, if not the first, to grasp the possibilities of the use of a metal of high heat conductivity was Robert Ayton, of Coventry, who on August 12th, 1898, lodged an application for a patent, and the complete specification was accepted on 12th October, 1899—nearly twenty years ago. In the early days of motor cycles we knew Mr. Ayton very well as an engineer and a motor cyclist, though we did not discover until we had made this search that the patent referred to was one of his many inventions. Since 1914 Mr. Ayton has been in the R.N.A.S., and is now a chief petty officer.

R. Ayton on the motor cycle he constructed in 1907 for the T.T. race. The engine is a Riley. Mr. Ayton won the first private owner's prize in the T.T.



We regret to say that he saw no direct benefit from the patent. He was too much in advance of the times, and suffered as many other far-sighted men have done. It is galling to think that a patent expires automatically at the end of fourteen years, when during that period no one recognises the value of the patent, and yet subsequently the scheme covered by the

patent specification becomes common practice. One is tempted to ejaculate, "Wake up, England!" But Mr. Ayton's patent was a strong one, and exceptionally lucid in expression.

In view of its particular interest to all air-cooled engine users and designers, we quote the wording of the original specification, and reproduce the drawing accompanying it. Note that the address named is not now correct.

### IMPROVEMENTS IN OR RELATING TO RADIATING DEVICES FOR HEATING OR COOLING PURPOSES.

I, Robert Charles Ayton, of 5, Richmond Terrace, Cox Street, Coventry, in the County of Warwick, engineer, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:

This invention relates to radiating devices for heating or cooling purposes.

According to this invention I provide the tube, cylinder, or other body from which heat is to be radiated, with a partial or total covering constructed of a metal having a higher conductivity than the metal of which the tube or cylinder itself is composed. Thus in applying the invention to the cylinder of an internal combustion engine, the cylinder may be provided with a conductive covering or with wings or gills constructed of aluminium, silver, or some alloy of these or other metals, whose heat conductivity is considerably greater than that of the iron or steel of which the cylinder is composed.

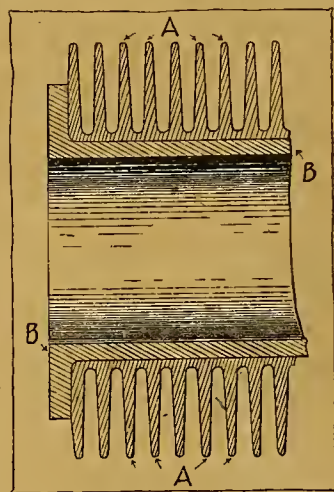
The conductive covering may be plain, corrugated, or provided with wings or gills, or the latter may be applied to the cylinder, tube, or other body separately or in groups, or the covering may be given any shape suitable for increasing the radiating surface of the tube or cylinder which is presented to the air or surrounding fluid.

It is, of course, necessary that the conductive covering should be applied to the radiating body in such a way as to ensure intimate contact between the metals of which the body and covering are composed.

The accompanying drawing illustrates in longitudinal section a portion of the cylinder of an internal combustion engine with radiating gills fitted in accordance with this invention.

The gills A, which may be of any convenient form, are made of some metal having a higher conductivity than the metal of which the cylinder B is composed. In order to ensure intimate contact between the metals it is preferable to cast the gills in position upon the cylinder, but other methods of placing the latter in position may be employed, thus, for example, the exterior of the cylinder may be tapered and the interior of the radiating covering being correspondingly shaped, or the radiating covering may be simply shrunk into place, the method of applying the covering varying in accordance with the body to which it is to be applied.

It will be understood that the invention is equally applicable in the construction of condenser tubes or radiators such as are employed for heating or cooling purposes.



### A MASTER PATENT?

The original drawing in Robert Charles Ayton's patent specification of August 12th, 1898.

A.—Cooling gills of some metal having a high heat conductivity.  
B.—Cylinder.



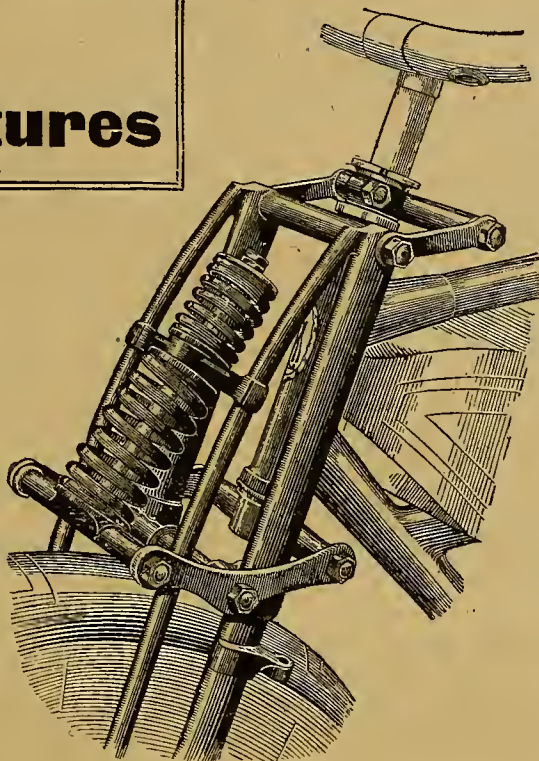
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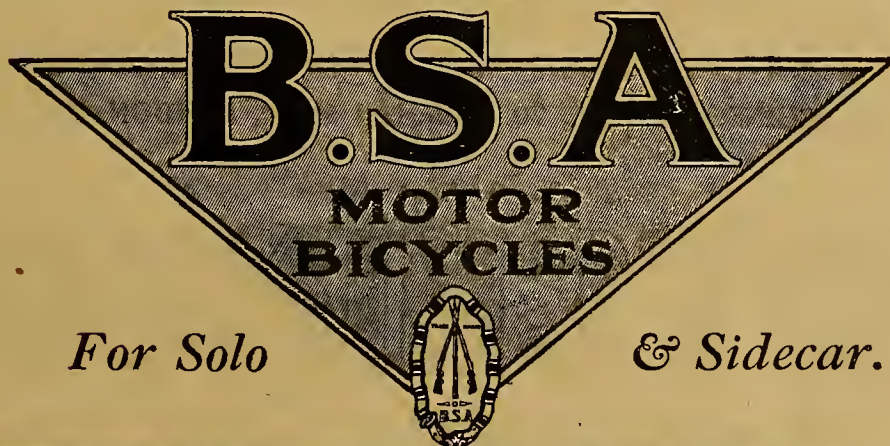
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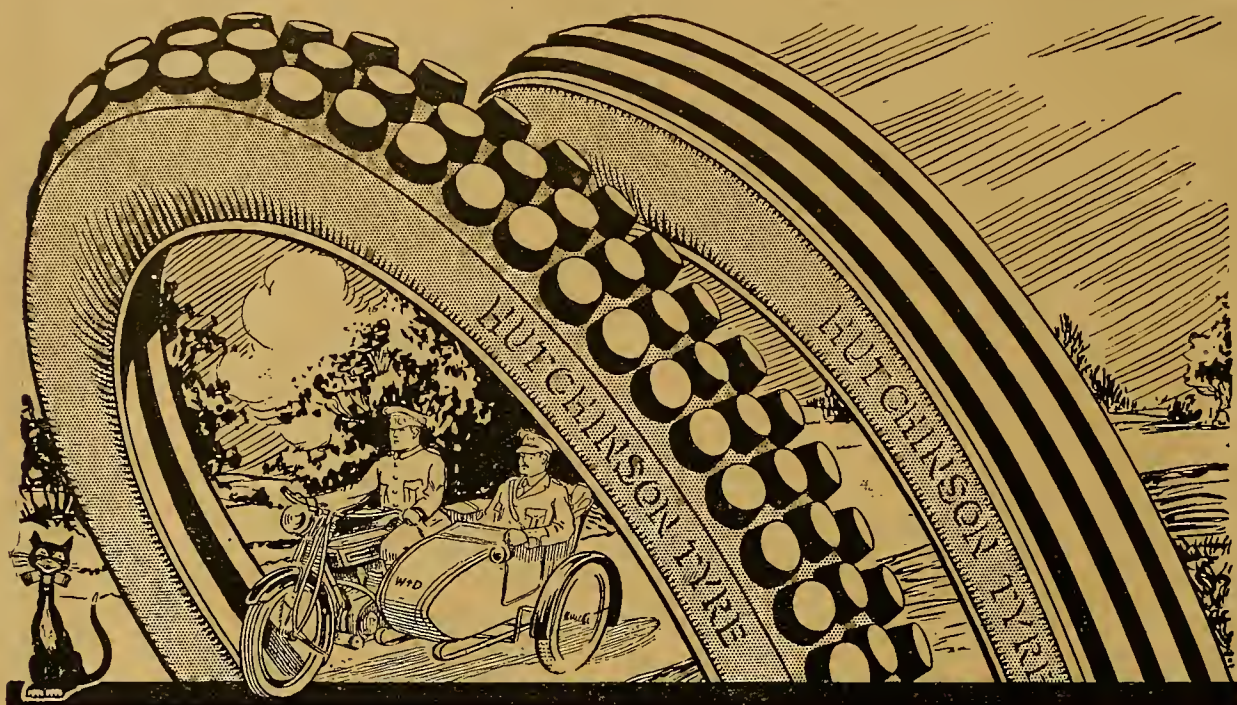
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*For Solo*

*& Sidecar.*





THE motor cyclist who rides on Hutchinson Tyres is not only helping to conserve his meagre petrol allowance—he is looking ahead, considering mileage cost and ensuring complete immunity from tyre troubles of every kind by using the best tyres that money can buy.—Do you ride on Hutchinson Tyres? May we send you our Catalogue?

## HUTCHINSON TOURIST TROPHY TYRES

THREE RIBBED OR RUBBER STUDDED

26×2"	26×2 $\frac{1}{4}$ "	26×2 $\frac{3}{8}$ "	26×2 $\frac{1}{2}$ "
30/9	33/-	34/9	35/9

Write for our Catalogue TO-DAY.

HUTCHINSON TYRES, 70, Basinghall Street, LONDON, E.C.2.

# HUTCHINSON

*"The Tyres with NINE Lives"*



**Aluminium and Air-cooling.—**

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:

1. The combination with a body radiating heat of a conductive covering formed of a metal having a higher conductivity than the metal of which the radiating body is composed.

2. The combination with a body radiating heat of radiating gills formed of a metal having a higher conductivity than the metal of which the radiating body is composed.

3. The combination with a body radiating heat of a conductive covering formed of a metal having a higher conductivity than the metal of which the body is composed and cast in position upon the body.

Dated this 12th day of May, 1899.

BOULT AND WADE,

Agents for the Applicant.

**Establishing the Original Patentee.**

Our conviction that aluminium will enter largely into the construction of petrol engines of the future has been re-echoed throughout the world. Its use promises to solve many of the outstanding difficulties to which motor cycles are commonly subject, such as:

- (1.) Rapid formation of carbon deposits.
- (2.) Knocking due to excessive heating.

- (3.) Short life of valves and seating.
- (4.) Excessive consumption of lubricating oil.
- (5.) Rattling in two-strokes.
- (6.) Sticking piston rings.

In investigating the subject of the employment of aluminium for air-cooled engines, our sole object was to determine the originator, so that praise could be offered where it is due. It has been our pleasure to offer hearty congratulations to our friend, Robert Ayton, upon his clear foresight, and sympathy that his patent should have expired before the advantages his system offered were generally appreciated. We have received from Mr. Ayton in reply a most interesting letter, extracts from which we hope to publish in our next issue. Incidentally Mr. Ayton has sent for perusal a copy of the only patent specification prior to his own of which he is aware, in which the use of aluminium is referred to as a material for cylinder cooling fins. This is a specification by E. J. Pennington, a pioneer of the motor industry. It is clear, however, that Pennington only suggested aluminium as a possible material on account of its ductility. This patent will be dealt with in more detail in the next instalment.



On Saturday the "Old Timers" of the cycling and motor cycle world met at Stonebridge, arriving on all manner of machines, the ancient crocks causing much amusement and interest. Our photograph shows some of the Coventry contingent starting. Left to right: Sam Wright, on the first Humber G.O. ever made; Mr. J. W. Maude (Centaur Co.) on an "ordinary"; and Mr. V. A. Holroyd (Rudge-Whitworth, Ltd.), a cyclist and a motor cyclist.

**AMERICAN MILITARY MOTOR CYCLES STANDARDISED.**

TO standardise the American motor cycle for war work was the main purpose of a meeting of American motor cycle engineers held recently at the headquarters of the Society of Automobile Engineers, New York.

No one American factory can turn out a sufficient number of motor cycles to supply the army America is raising, and, therefore, it is necessary that steps be taken to standardise the parts of the various machines used. It was urged that the S.A.E. screw

thread be standardised, and that standard gauges for belts be adopted forthwith, and be put into immediate operation on machines built for the new army.

Committees were formed to work out suitable standards for wheel rims, tyres, spokes, handles, hubs, chain sprockets, handle-bars, and controls generally. Motor cycle parts, such as pistons and connecting rods, are to be standardised so far as their varying designs permit, and this also applies to chain guards, mudguards, tanks, filler caps, etc.



# Current Chat

## TIMES TO LIGHT LAMPS.

SUMMER TIME.			
July	5th	...	9.47 p.m.
"	7th	...	9.46 "
"	9th	...	9.45 "
"	11th	...	9.43 "

## A.S.C. (M.T.) Motor Cyclist and Speed Permit.

An A.S.C. (M.T.) motor cyclist, Cpl. Sutcliffe, was stated to have no permit to travel at more than 10 m.p.h. He had to pay 30s. for exceeding this speed on the London Road, Bromley.

## The Red Cross "Draw."

Tickets issued in connection with the "draw" for a lightweight motor cycle arranged by the British Red Cross Society, Newcastle-under-Lyme, totalled 106,000 at the end of last week. The secretary has traced the sale of 8,800 tickets through *The Motor-Cycle*.

## Lady Motor Cyclist, Officer, and Special.

Eileen Manwell was charged at Bromley with driving a motor cycle without a light. Special Constable Palmer, in evidence, said when he asked for her licence, an officer in the sidecar said she need not produce it as he was not in uniform. He also tried to prevent him from taking the numbers. A double fine, 20s., was imposed on the lady.

## New Petrol Control Department.

The Board of Trade has announced that the duties hitherto performed by the Petrol Control Committee are now to be undertaken by a Petrol Control Department of the Board of Trade. Sir Evan Jones, Bt., M.I.C.E., is to be Controller of the new department, Mr. P. G. L. Webb, deputy Controller, and Mr. H. W. Cole, Chief Clerk.

## Maintaining 438 Miles per Day on a Four-cylinder.

Recently Alan T. Bedell, a well-known American rider, rode across the continent on a 1917 four-cylinder Henderson in 7 days 16 hours and 16 minutes. Bedell started with a military message from Los Angeles, California, and duly delivered it to General Bell at Governor's Island, incidentally reducing the Transcontinental record by 3 days 18 hours 54 minutes. Rough and trackless country was negotiated, yet Bedell managed to maintain the extraordinary daily mileage of 438. No mechanical troubles were experienced, and the big four-cylinder finished the trip ticking over perfectly sweetly. And yet one reads so often that the additional complication of the "four" renders it impracticable!

## Messrs. Brown Bros.' Report.

The twentieth annual report of Messrs. Brown Bros., Ltd., shows that £40,715 profit was made in the year ended 1916. A dividend of 7½% (2½% interim dividend already paid), tax free, was declared on the ordinary shares, and bonus 2½% (tax free). £25,781 was carried forward to the next account.

## Bent Number Plate—a Conviction.

An Orpington motor cycle agent has been fined for using a motor cycle with a bent rear number plate. He pleaded ignorance of the regulation. Are front plates shaped to the curvature of the guard illegal?

## To get you Home.

The A.C.U. is now issuing vouchers in connection with its "get you home" scheme, which should be highly appreciated in these days of petrol shortage and of old corks. The idea is that a member can, in the event of a breakdown, obtain assistance and secure conveyance to a railway station or to his destination—if it lies within a distance of twenty miles. No provision is made for the imposter who rides deliberately out into the country till his petrol gives out, on the strength of obtaining a gratis ride home at the expense of the Union.

## SPECIAL FEATURES.

**POLICEWOMEN WHO MOTOR CYCLE.**  
SINGLE LEVER CARBURETTORS.  
ALUMINIUM AND AIR-COOLING.

## A Gigantic Blotting Pad.

Coventry is an absorbing city in these days of munitions. The pavements are not wide enough for the populace, with the result that the latter absorbs the road as its personal property. When one leaves small change on the table for the waiter, it is absorbed ere that gentleman's wide-awake eye discovers it. He in turn will tell you that the Cerebos salt cellars are absorbed wholesale, "owing to the people who come here who never used to have the money." Some of the munition workers are out to do themselves well.

## Alteration of Title.

The title of the Electric Ignition Co. (1913), Ltd., has been altered, by permission of the Board of Trade, to E.I.C. Magnetos, Ltd. The registered trademark, "E.I.C.," has naturally attained some reputation, not only on account of the quality of the goods turned out by this firm, but on account of the excellent treatment their customers have received, and therefore, for the sake of brevity, it has been decided to adopt these letters as the business title of the firm.



## WHICH DO YOU PREFER?

Types of single track machines at the Midland "Old Timers" meeting at Stonebridge last Saturday.



**The National War Funds.**

At the week-end the principal war funds stood as follow:

The National Relief Fund (distributed £3,618,622) .. ..	£6,201,086	0	0
British Red Cross Fund .. ..	7,013,694	16	3
Tobacco Fund .. ..	131,936	0	0

**A Cut-out Demagnetises a Magneto.**

A talented electrician has proved to a member of our staff, by experiment, that the use of a magneto cut-out very gradually demagnetises the magnets. The proof obtained was first by testing the voltage given off by the primary circuit, then running the magneto at a good speed for a few minutes with the cut-out in action, i.e., short-circuiting the primary circuit. When the voltage was tested after the shorting it was found to have dropped somewhat, but after remagnetising showed its former reading upon test.

**The Crank Case Release.**

Many makers are not quite so considerate as they might be as regards the type of crank case release they employ and the position in which they place it. More often than not it deposits oil over the inaccessible and uncleanable nooks; while the type commonly utilised to keep the front chain lubricated, and fitted with an extension pipe for that purpose, is, unless the chain be totally enclosed, a doubtful blessing. It distributes oil vapour and spray impartially, and the chain still requires periodical attention.

This is an important point as regards external cleanliness which makers would do well to bear in mind.

**Another Lady Rider on War Work.**

Most lady riders of the early days have proved themselves to be of the practical sort in this time of scarcity, and yet another well-known lady competition rider to give up her time to war work is Miss Mary Reid, who is now employed at the factory of Brough motor cycles.

**For Prisoners of War.**

In March, 1916, the R.A.C. started a fund to provide food and other necessities for the civilian motor drivers interned at Ruhleben. These men were in civilian service in Germany at the outbreak of war, and most of them are still enduring a most tedious existence as prisoners at Ruhleben, where they suffer many hardships and indignities.

Since the R.A.C. fund was opened parcels have been despatched weekly, and many letters and postcards have been received from the interned men stating how much they have appreciated these donations, which have helped to make life possible. Moreover, these parcels show the men that they are not forgotten by their more fortunate friends safe in England.

The R.A.C., however, has recently lost many subscribers to the fund, which is in need of further support, and we are asked to announce that support of this worthy cause is urgently needed—even the smallest amounts being useful. Address, R.A.C. Presents of War Fund, Royal Automobile Club, London, S.W.

**The Metric Measure.**

The General Assembly of the French Chambers of Commerce has expressed the hope that Great Britain, Japan, and Russia will adopt the metric system.

**Aluminium and Air-cooled Engines.**

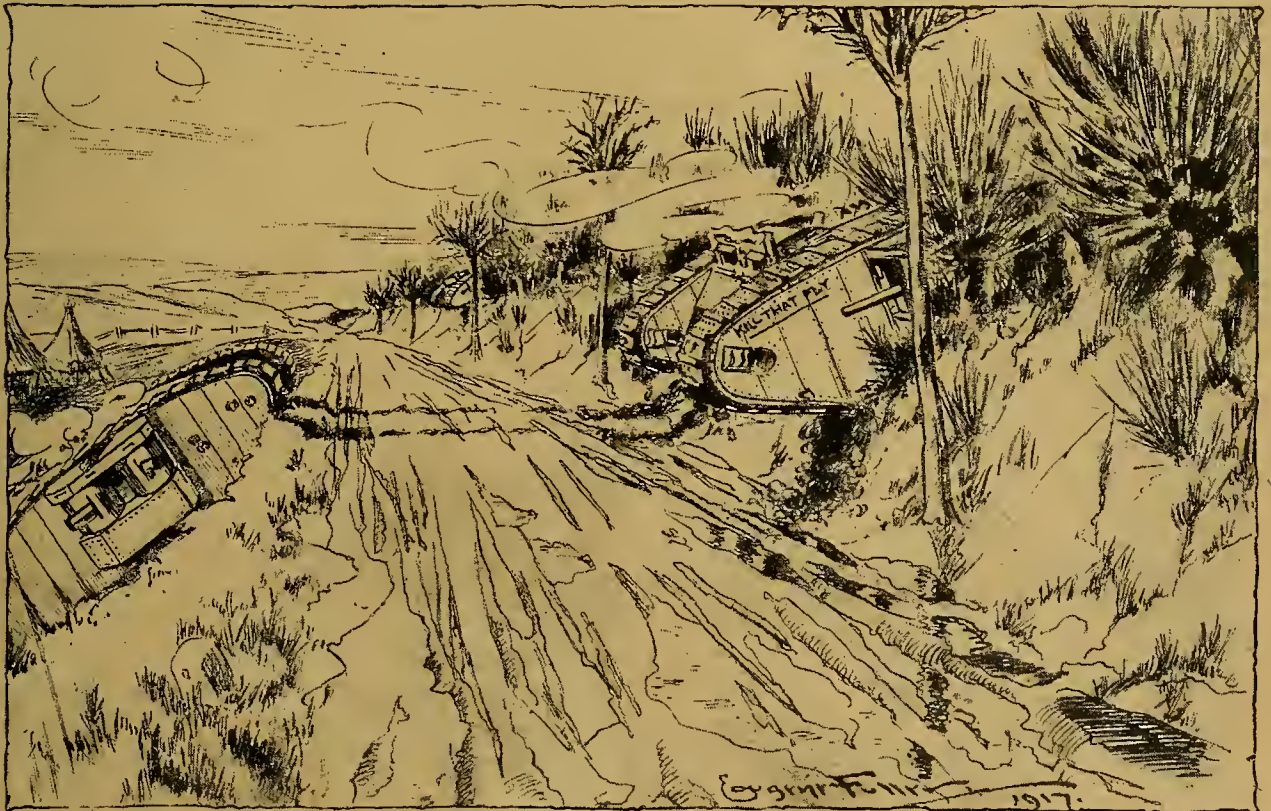
The use of aluminium for cooling purposes is not nearly so new as the average man supposes. *The Motor Cycle* has investigated its origin, and attention is drawn to an informative article in this issue.

**A Fast Touring Mount.**

A member of our staff recently undertook a 300 mile trip on an overhead valve flat twin—the latest production of the Brough factory. For fast touring and maintained high speeds this type of engine is almost a revelation, rivalled only by a good T.T. Scott.

**The Humble Hack.**

In these days most of us find it necessary to augment the motor cycle by the occasional use of a pedal cycle, and a very useful auxiliary it proves. Yet we who pride ourselves upon our mechanical aptitude find we are very prone to subject our humble pedal cycles to a neglect we should deem criminal in the case of the mechanically-propelled machine, till one day an irritating squeak awakes us to the fact that "the poor old beast wants oiling." We owe much to the pedal cycle, yet it is so easy to forget.



WHAT THE LATEST TANKS CAN DO!

Incidentally the reproduction shows what the men of the Tanks can do too, for the excellent drawing is by a gunner of the Tanks. It represents Tanks on their way to the line, Gnr. E. Fuller's inspiration for the drawing being obtained from another Tank in company.



# THE "ISLE

A series of exclusive photographs showing aspects of the Front the French Army have held the line opposite to the places southward, comparatively few of our men have been in these

I AM now at the Front again with my Heavy Artillery Group, though not yet quite recovered. To my regret, I shall not be able to ride a motor cycle again for some time, but I long intensely to be astride my Triumph once more. As an Ally and Frenchman, may I express the hope that after the war the English D.R. and other motor cyclists will visit France, either to see the parts of our country which have been the theatres of battles, or to spend a holiday touring midst the beautiful scenery and on the good roads that France possesses? Landscapes we have of sufficient charm and variety to please the most fastidious traveller in all

his requirements.

These photographs show a few of the aspects of the "war zone," parts of the French Front which are but little known to the English soldiers.

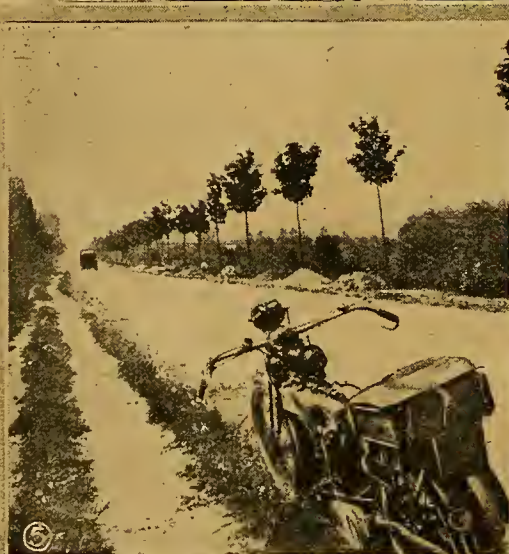
I have had the opportunity of covering all the Front in France from the sea to the *frontière* whilst with the Heavy Artillery. The departments of the Pas de Calais and of the Somme are too well known to our English friends for me to speak of them: but I feel obliged to say that we are thankful for the gallant efforts they make every day to push back the Huns' occupation.

We took for a time the Aisne sector between Compiègne and Soissons. This part is called the "Isle of France," and it is a very beautiful part of the country, the valley in which the River Aisne calmly runs being particularly interesting.

No. 1. The castle of Vez, near Villers Coterets. This picture shows the perfect state of the roads.

No. 2. A road on which traffic is suspended in the daytime. Soldiers guard the "limit," and in order to hide there are screens made of branches suspended from wires, or fences of straw, along the way.

In No. 3 one can see the heights occupied at that time by the Boches. Note the splendid road which curls down the hill on the right. This was taken in the wine-producing district. The very celebrated wines of this lovely country are





# OF FRANCE."

yet little known to our fighting men. Up to the present recorded, and though we are gradually extending our line of observation.

(By a Correspondent in the French Army.)

The map will assist in locating the scenes described.



appreciated all over the world, but Rheims and Epernay, where they are made, are not sufficiently known. They are gay and delicious little towns! The lives of the inhabitants there seemed happy and the people very kind. The ground is undulating, and the wine fields give a tint of green, blue, or yellow, according to the time of the year, the red and white buildings of the villages nestling together making very picturesque scenes.

No 4. Vine fields near the German lines. The plain for five miles distant is under observation by the Huns, and the D.R.'s sometimes suffer on account of this.

From the picture No.

one obtains an idea of the splendid and fast roads erected to speed men. This is the highway from Reims to Rheims, and on its fine surface the fastest machine seems slow. The trusty Triumph is seen on the roadside.

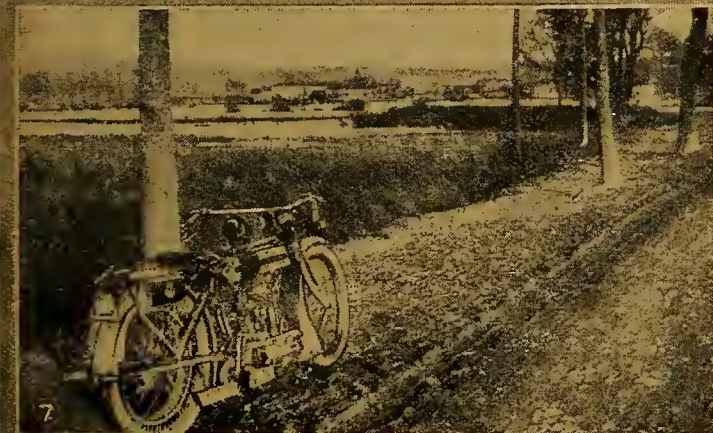
No. 6. A canal lateral to the Meuse; the road alongside leads to the famous city of Verdun. In the barges beneath the trees soldiers are billeted.

No. 7. The River Meuse and the little village of Verdun in the background.

No. 8. A D.R. studying the locality by means of a map. One would hardly believe that delightful the scene is quite near the firing line.

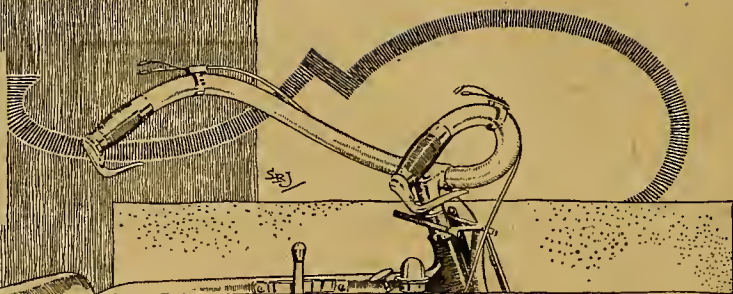
When one goes further east the country becomes more over, and woods commence to cover the ground, and it has a savage type of beauty all its own. You are in the Argonne country, and midst the terrible Verdun sector, which is among the worst for desert riding in the whole of France. The battle had been raging when I visited this part, and the traffic was intense and the mud simply awful.

I hope to get even by calmly touring, when peace arrives, on a good English motor cycle in these places, where the war will have left such unalterable and powerful impressions. I hope also to meet on the way many of our gallant Allies and friends—if you will allow me this term—who may be visiting these scenes of ineffaceable memories. H. E. PLATEAU.





## CANTILEVER SPRINGING.



How the System is appealing to Manufacturers. Three Designs now under Test.

THE methods adopted in the springing of motor cycles are many and various.

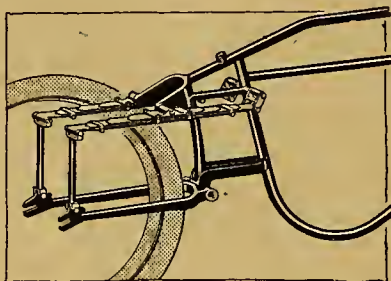
Leaf springs perhaps predominate, and rightly so; but coil springs, too, are used very effectively on many machines. The special advantage of the leaf spring is, of course, the damping effect of the friction between the leaves. This eases and absorbs the rebound, which would otherwise take place after the obstacle was passed. The leaf springs favoured generally take the form of quarter-elliptic. This has the advantage of keeping the weight down to a minimum where leaf springs are employed, but the springs must be very securely anchored to a part of the frame which is sufficiently strong to carry the weight. The grasshopper, or cantilever, type of spring is in itself heavier than the quarter-elliptic owing to its greater length and the necessity for increased stiffness if the springing movement is not to be somewhat excessive, but the anchorage may be lighter.

### An Early Adaptation of the Cantilever Spring.

It is not generally known that one of the first firms to experiment with a cantilever system of springing was the Hendee Co., and on March 7th, 1914, Mr. Oscar Hedstrom's patent, covering a cantilever design of spring frame for Indian motor cycles, was filed. The sketch we give on this page shows the principle of this patent, which, it will be seen, is very different from the Indian system of rear springing with which we are all familiar.

The Indian Co. has very thoroughly

tested the design here shown; but Mr. Hedstrom does not consider this type of spring frame so good as the original Indian design, which is still in use.



A patented design of cantilever springing as fitted to an Indian frame.

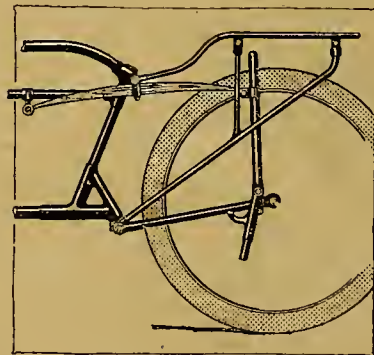
On November 2nd, 1914, Messrs. Douglas Bros. applied for a patent to cover their system of cantilever springing, which, in its improved form, is well known to our readers. In this design rather shorter springs are used than in the case of the Indian, while the Douglas frame certainly seems to be an improvement on the American design as regards reduction of weight.

On November 25th, 1915, a patent was granted for yet another system of rear springing which involved the cantilever principle, the James spring frame being, perhaps, most remarkable for the unusual length of the springs used, these

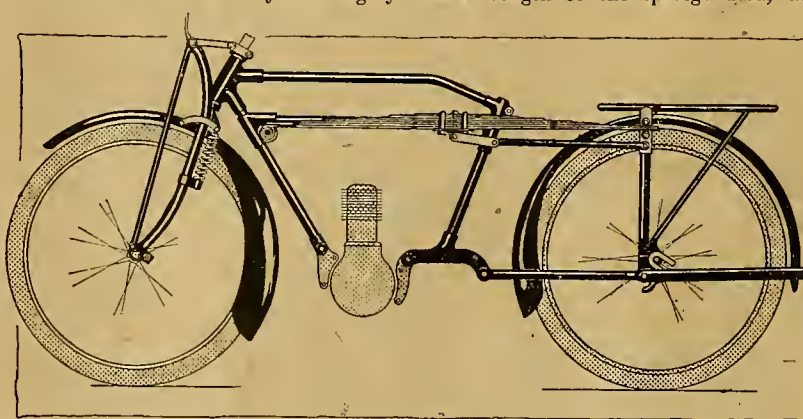
extending from a point above the centre of the rear wheel to the brazed junction which generally supports the front side-car coupling. The springs are pivoted centrally, and, owing to their great length, a very wide range of vertical movement is permitted to the rear wheel, though the weight seems rather high.

### A Promising Design.

Each of these three interesting systems of springing is the work of a highly practical designer, and it will be interesting to note whether the cantilever



Details of the Douglas cantilever spring frame. Its construction insulates the carrier from shocks sustained by the wheel spindle.



The James cantilever spring is pivoted centrally, a good deal of vertical movement being possible owing to the unusual length of the spring.

system, which offers certain unquestionable advantages on paper, will hold its own against the more common quarter-elliptic type. Though similar in principle, the three designs differ to a more or less appreciable extent in matters of detail and in the method of application. On paper the cantilever springing of motor cycles looks extremely promising; it is neat in appearance, and, by reason of the suppleness afforded by such a long leaf spring, suggests the maximum comfort on rough surfaces. Yet it is curious that, although three different firms have devoted attention to the design, as proved by the fact of patents having been obtained, none have been standardised for public sale. Probably had the times been more favourable, Douglas Bros., at any rate, would have listed their spring frame model, since it has already passed through different stages of development.



## MILITARY NOTES.

## AUSTRALIAN D.R.'s.

**A**RT.-CPL. C. H. FISHER, speaking of the despatch riders attached to the 3rd Australian Division in France, says:

"In the big push of the last few weeks the men and machines have done a lot of hard work. I am glad to say that all the boys are still above ground; and as to the machines, the old Triumphs, they also have stood up to it well.

"We are now out for a rest, which is certainly due and will be appreciated."

□ □ □

## WAR-WORN MOTOR CYCLES FOR WAR-WORN MEN.

**P**TE. J. F. SPENCER, A.S.C. (M.T.), writes from France as follows: "I am very interested in the article describing the dump of disabled motor cycles. Do you not think that those who have taken an active part in the field should have the first opportunity of purchasing a mount from this source?" We quite agree if the motor cycles are to be offered for sale. He goes on: "The article by A. J. Sproston on 'After-war Problems' is quite in accordance with my ideas. Undoubtedly the four-cylinder engine for sidecar work will come into its own."

Spencer was a well-known member of the Coventry and Warwickshire Motor Club, and formerly joint proprietor of the Priory Accessories Company.

□ □ □

## AN AMERICAN RIOT CAR.

**A**MONG the motor war vehicles which are being made by our Allies in the States is the Cygnet Riot Car. In the event of a riot or disturbance, the outfit can convey four men to the



MOTOR CYCLIST D.R.'s OF THE 3RD AUSTRALIAN DIVISION  
(Top) Cpls. Fisher, Dolg, Egerton, Werrin, Benner, and Blanch.  
(Kneeling) Cpls. Hollins, Shaw, Spr. Wylie, Cpls. Symes, Hitchbrooke, and Traill  
(Bottom) Cpl. Lightwood and Spr. Cotton.

scene of trouble very quickly. The construction of the body is such as to provide for holding standard rifles underneath the seats.

In addition to being of value in regular military work, this model is also becoming very popular in the equipment of home defence organisations. The illustration given is of one of several outfits supplied to the Lewis Machine Gun Company (Montclair, N.J., Battery).

## A TRIO OF MOTOR CYCLISTS IN THE R.F.C.

**R.** O. CLARK, of Norwich, who was a leading exponent of the F.N. machine and well-known to competition men, is an Equipment Officer of the R.F.C. (Motor Transport Section). Two other motor cyclists well known to a large section of our readers are E. Kickham, the Bristol motor cycle agent, who is a 2nd air mechanic, and F. J. Watson, of the Motor Cycling Club (London), who has scored many notable successes on Ariel machines.

□ □ □

## HE AND SHE TANKS!

**D**R. ADDISON, Minister of Munitions, reviewing in the House of Commons the position of war munition supplies, remarked, concerning the Tanks: "The Tank made his appearance last autumn. I say 'his,' for we distinguish a male and a female variety. At the close of last year much work required to be done in the way of alteration and improvement, as the experience of the Somme suggested, but the supplies of the new designs are coming forward excellently, and the end of the story is not yet, for the enthusiasm of Col. Stern, Sir Eustace d'Eyncourt, and their colleagues knows no limits."

□ □ □

## LOSS OF THE EASTERN MAILS.

**T**HE Postmaster-General announces that the letter mails for India, the Mesopotamian Expeditionary Force, Ceylon, the Straits Settlements, and beyond, and also for Australasia, which were despatched from London on May 31st last have been lost at sea, also the parcel mails for the same destinations despatched on May 23rd. The same fate has overtaken letters and newspapers for the Salonica Force posted on May 22nd, May 24th, and June 9th.



The Cygnet Riot car is employed by the Home Defence organisations of America, and used to convey men with rifles in case of trouble.





The Editor does not hold himself responsible for the opinions of his correspondents.  
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### AN APPRECIATION OF THE P. AND M.

Sir,—With regard to the speed of the P. and M. motor cycle, to which several references have recently been made in your columns, I think the impression that the speed of these machines is not equal to other motor cycles of similar power has been formed from the fact that the great bulk of the P. and M. machines have been geared by the manufacturers for sidecar work. As a matter of fact, the design of the engine and transmission ensures as high a speed as it is possible to obtain, taking into consideration the necessary durability of the parts for ordinary work.

It is a fact that machines turned out from the works, standard in every respect and geared at  $5\frac{1}{2}$  to 1, have, on several occasions, lapped at Brooklands (two miles 1,350ft.) at 50 m.p.h., which represents an engine speed of nearly 3,400 r.p.m.

Any P. and M. machine, with the standard solo gear ratio of 4.8 to 1 is capable of a speed of 50 m.p.h., without any alterations to the standard timing, compression, etc.

B. MARIANS.

#### PETROL ALLOWANCES.

Sir,—Like you, I must say I feel considerably annoyed when I see in the press that meaningless "squealing" suggesting that the Petrol Control Committee has been over-generous in the granting of permits. Probably the squealers would change their tune if they knew what the restrictions really mean to those who are compelled to live in a remote mining village. It is all very well for those to talk who have a station within easy reach, tramway cars, "taxis" at stands, etc., but let them imagine themselves in my position, for instance. Our railway station is two miles off and very few trains run to it. The nearest town (Ayr) is  $10\frac{1}{2}$  miles off by road (return fare 3s. 6d.) To get to the station a hire costs 3s. Now we cannot possibly get everything we want in the village. But in addition to that it is not a case of pleasure-seeking when I say it is essential for me or anyone else to get out of here occasionally. Just try to imagine how nerve-racking it is to teach day after day in a mining village where there are no means whatever of obtaining any mental relaxation—no library even. I do not think it is a case of pleasure-seeking when I say an occasional change is essential to make life possible. With my bicycle and sidecar I can take my wife and two little children to Ayr for about one-third gallon of fuel. Now I must hire a machine to the station (3s.), two full return fares at 3s. 6d. (7s.), two half return fares at 1s. 9d. (3s. 6d.), total 13s. 6d., against, say, 1s. 6d. or so by motor cycle. "Some" war economy!

Of course the "squealers" say, "Stay at home always." My answer to them would be, "Come and live in a remote mining village for a time, and then you will know what you are talking about." Again, the doctor who attends the village lives five miles off by road and is not on the telephone; he might be another five miles off on the other side when you go for him. The nearest chemist and druggist's shop is five miles off. Along with this, as I pointed out to the Control Committee, I am absolutely forbidden to ride a pedal cycle. However, the Petrol Control Committee has quite made up its mind that if anyone connected with me becomes suddenly ill and requires a doctor or drug, that person must just die. All these facts have been put before the committee, yet it cannot even see its way to allow me a gallon a month to keep in case of emergency.

Ayrshire.

NO JOY-RIDER.

#### AN IDEAL MOUNT FOR A LADY.

Sir,—I see "Cadet" mentions "more miles per gallon"—my  $2\frac{1}{4}$  h.p. Velocette used exactly half a gallon of petrol in the forty-nine miles between Worthing and Kingston, and ran on the high gear the whole way. Its usual speed, when nearly throttled down, is 20 m.p.h. by the Stewart speedometer. On the way home it occurred to me that there is so little to do in managing this little machine that I am liable to forget that there is anything at all to be done—except just to guide it round corners and restrain it through villages. There is no kick-starter, but two or three pushes are enough to make it start. I expect you know all about Velocettes, but I have talked with other women and these are the things they wanted to know.

A.B.

Worthing.

#### SHOCK FROM A SOOTED PLUG.

Sir,—"Ixion's" comments are generally so excellent that I received a shock far worse than any obtainable from a sooted or unsooted plug on seeing his remarks on "Shock from a Sooted Plug" in *The Motor Cycle* of June 28th. He says, "Popular electrical manuals assert that electricity always selects the 'shortest' road home"; and after suggesting that this means the path of least electrical resistance, says, "Perhaps, therefore, a sooted plug will only give a shock at its outer terminal when the short-circuiting path offers less electrical resistance than the alternative path down the central wire of the plug and across the carbon bridge."

Am I really to understand, sir, that "Ixion," the joy of my motor cycling youth, the prop of my declining years, does not know the simple rule that the flow of current through alternative paths is inversely proportional to the resistance of those paths? That is to say, that if there are two paths for a current, one offering (say) ten times as much resistance as the other, the current will not confine itself to the path of least resistance, but will flow through both, though the current flowing through the path of least resistance will be ten times as great as that flowing through the other path.

When this simple principle is grasped, "Ixion's" problem ceases to be a problem.

Norwood, S.E.

SHOCKED.

#### THE ADVANTAGE OF THORN CATCHERS.

Sir,—I am an engineer by profession, and have always done all my own repairs, keeping my machine in good condition. My home is about thirty-six miles from the works at which I am employed, and I use the motor cycle in order to spend almost every week-end at home.

My machine is a 4 h.p. Bradbury, which I have had since 1911, and it has given me splendid service. I have, of course, modernised it, fitted adjustable tappets, etc., and in 1914 I fitted to it a N.S.U. two-speed gear.

I always carry "thorn catchers," and cannot understand anyone riding a motor cycle without something suspended around the tyre to knock off the thorns, nails, flints, etc., which simply cannot penetrate the tyre at the first impact. The result is that roadside repairs are very rare indeed with me. As a matter of fact, after nearly four years of frequent rides between Briton Ferry and Pontypridd I have only, to my recollection, had two punctures, though I may have had a few while on other rides. Both these punctures were obtained at the time my "catcher" was missing.

Though many readers may scoff, I can state that, taking only my mileage since the petrol licences came into operation and allowing for bare gallons marked thereon, nothing allowed for shortages in tins, which are frequent, flooding,



cleaning oil spots off clothes, etc., in nine months' riding, I have just run over 100 m.p.g. on a 30 B. and B. jet.

My troubles have been very few indeed, confined practically to (1) violent contact with an Airedale dog at about 30 m.p.h., which was bad for the bicycle and very much worse for the dog—I got off with a shaking; (2) during the cold weather this year I had trouble on four or five mornings in starting up, but after taking off the inlet valve cap and warming it on a gas stove I could always start up at once.

In my opinion, singles cannot be beaten for reliability and economical riding, and no doubt there are hundreds of practical mechanics who prefer an old "big single" with an engine-shaft speed gear or Philipson pulley. These fairly ancient machines have very little about them to go wrong, and they are also very much lighter than modern counter-shaft machines—a decided advantage.

Pontypridd.

CYMRO.

### BALL BEARING CONNECTING RODS.

Sir.—May I be allowed to reply to "Pip-Emma" by saying that the main points of his letter in your last issue do nothing but corroborate my contention that the rotary engine is a reciprocating engine, and I quite agree with all that he says, except the last two sentences?

The crank pin centre is a point fixed outside the circle of the crankshaft, and is therefore concentric.

I did not lose sight of the fact that the pistons describe a circle during a revolution of the engine, and that the centre of that circle is the crank pin; nor of the fact that this piston circle, being within the circle described by the cylinders, is eccentric thereto; nor of the fact that the eccentricity of these two circles represents the distance that the pistons reciprocate along the cylinders.

The pistons have two motions—one rotary relative to the crank pin; the other is a reciprocating motion relative to the centre of the crankshaft and to the cylinders. The pistons come to rest at each end of the stroke, and accelerate and decelerate quite the same as a piston in a stationary engine; but, while they are at rest at each end of their reciprocating stroke, they are certainly not at rest centrifugally. In this sense only can the pistons be said to be never at rest.

Your correspondent must agree with me in that the pistons move to and from each end of the cylinders; if he does, then he must agree that the piston is a reciprocating part. The rotary motion must not be confounded with the reciprocating motion; they are two separate and distinct motions. The former motion is a resultant of the latter. If an engine possesses a crank which moves a piston, or a piston which turns a crank, then that engine must unquestionably be an engine, or machine, with reciprocating parts.

The reciprocating "effect" which your correspondent mentions at the conclusion of his letter is a fact; the expression "effect" seems to convey something of an illusory character.

The only true rotary engine is the turbine.

PICARDY PITT.

Sir,—I cannot pass "Picardy Pitt's" remarks in your issue dated June 21st, lest your readers might think I agree with them. As a matter of fact, there is practically nothing in his letter which throws any additional light on the subject under discussion, but there is much in it which might confuse your readers should they take it seriously.

First, let me advise "Picardy Pitt" to read "J.C.B.'s" letter in your issue for May 24th. Perhaps he will then understand my reply to that letter in your issue for May 31st. My letter does not contain any "very obvious errors," as "Picardy Pitt" would like to make out. I do not withdraw one word of that letter, and claim that my statements are quite clear, correct, and intelligible to anyone with a moderate knowledge of mechanics as applied to the petrol engine. Unfortunately—as I know too well—there are a number of persons masquerading as aero engine mechanics, who have little or no knowledge of the underlying principles of the aero engine. Briefly I will answer some of "Picardy Pitt's" statements.

Paragraph 2. The rotary engine certainly is not a reciprocating one, but the rotating cylinder engine has a few slightly reciprocating parts, such as valves, rockers, tappets, etc. I made no inference that radial and rotary engines are of the same class, excepting that the connecting rods are all brought together at one point on the crankshaft.

The Gnome, Clerget, Gnome monosoupape, and le Rhône are not true rotary engines, but rotating cylinder engines. An engine containing reciprocating parts cannot be a true rotary engine, although the term "rotary" is commonly applied to the above engines.

Paragraph 3. If "Picardy Pitt" had realised the difference between my "given point" (crank pin) and the "central point" (crankshaft) in his statement, all the wind in this paragraph would have been saved. I made no such statement that "the pistons, through their respective connecting rods, are being whirled round a central point." My statement says "round a given point" (crank pin). I repeat this now, and add that in the Gnome, Clerget, and Gnome monosoupape the pistons follow practically a circular path, and in the le Rhône a true circular path, in space. The pistons do not reciprocate in space, as they do in a stationary engine.

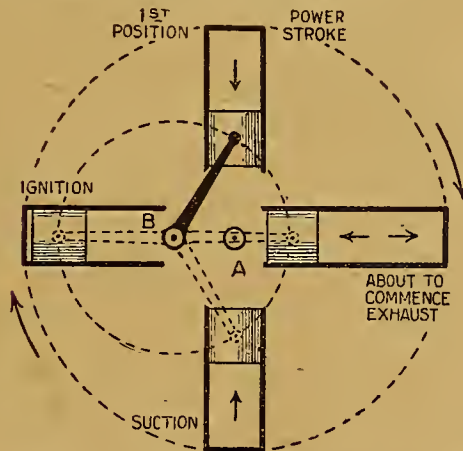
Paragraph 4 is all very interesting, but the majority of it has no bearing on the subject under discussion. The only important part of it bearing on ball bearing connecting rods is that near the end of the paragraph, where eleven lines are wasted to tell your readers what I had already told them in six lines in my letter of May 31st.

TECH. SGT.-MAJ., R.F.C.

Sir,—Re the letters under the above heading from "Picardy Pitt" and "Pip-Emma," the following diagram may serve to elucidate this matter further.

The crankshaft A is, of course, fixed, as is the crank pin B. The cylinder rotates about point A, and the piston and connecting rod about point B.

Now it is easily seen that the motion of the piston in space (provided the engine is stationary in space) is a circle. It is equally evident that the motion of the piston relative to the cylinder is reciprocating.



A diagram to show the movement of the piston in the cylinders of a rotating engine.

As regards stresses on the big end bearing, these will be the same as in the stationary cylinder type, but modified by the action of centrifugal force on the piston and connecting rod. During the compression and firing strokes the stress on the bearing will be less than in the stationary engine by an ascertainable amount, and during the other periods will be greater by a similar amount.

As to whether the engine is of the reciprocating type or not depends on the accepted definition of a reciprocating engine.

If the term "rotary" engines excluded all engines except those in which the whole moving part or parts revolve round a fixed axis with the same angular velocity, then the term rotary would cover only steam, gas, or water turbines.

Again, if the term "reciprocating engines" included all engines in which any part or parts have with respect to any other part or parts a reciprocating motion, then the so-called rotary engine under discussion would come under this heading.

It would seem, however, to be generally understood that a rotary engine refers to one in which the cylinders move in a circular path round a fixed axis.

ENGRO.

Baildon, Yorks.



## ALUMINIUM CYLINDERS.

Sir,—We have been interested in reading Mr. G. Funck's article in your issue of June 21st in regard to aluminium alloy pistons, and we would desire to direct attention to one point which he raises.

Amongst the "some disadvantages" which he states aluminium alloys possess, the first is given as "small tensile strength." This is, of course, quite correct in so far as pure aluminium is concerned, and is also correct in regard to many of its alloys. But there are aluminium alloys which will compare favourably in this respect with cast iron. Thus, Magnalite has a tensile strength of 27,000 lb. per square inch, and Aerolight 28,000 lb. per square inch, which is, we believe, substantially higher than that of cast iron. Cast iron varies considerably, but the average tensile of this material is in the neighbourhood of 16,000-17,000 lb. So that it would appear that either of these materials would be perfectly suitable for aluminium cylinders without any need for steel or cast iron liners.

The only point in regard to liners which we have no definite information upon is as to the frictional properties of the alloys. In other words, how alloy cylinders unlined would stand the working of the piston.

BRANCO, LTD.

## TWO-STROKE V. FOUR-STROKE.

Sir,—I did not wish to enter into correspondence, but I cannot refrain any longer. I am not an old motor cyclist, but have driven my own motor car and done the running repairs for six years; and in order to be a companion for my boy, I purchased a 2½ h.p. Sun two-stroke in October last. I had previously bought him a 2½ h.p. Levis two-stroke, and these two machines are giving every satisfaction.

About six weeks ago we started off together from Birkenhead to Bala, Barmouth, Criccieth, then home by Beddgelert, Bettws-y-Coed, Abergelle, and Queen's Ferry, and our mileage worked out at 110 miles per gallon. I am 12 stone weight, and was able to go ahead up hill and down without any trouble whatever.

How anyone could wish for a better performance than this is a mystery to me; and the idea of purchasing a four-stroke, with valves to grind in, tappets to adjust, and not nearly such an even pull as a two-stroke, is also a mystery to me.

I am a practical engineer with thirty-five years' experience of all classes of engines, and think there is no doubt whatever that a simple engine like the two-stroke is undoubtedly the engine of the future, as it is cheaper and better. Usual disclaimer.

TEMBAL.

Liverpool.

Sir,—I was considerably interested in "The Critics'" discussion concerning the two-stroke and four-stroke in your issue of May 31st. As I have been a constant reader of your valuable paper for some years, and have never before put forward my humble opinions in your columns, I hope I may be allowed to say that I do not agree with the popular opinion that the two-stroke is more extravagant than the four in fuel, but poor consumption on any particular machine is without doubt due to faulty carburetter adjustment, or in many cases to an unsuitable carburetter. A great many carburetters fitted to two-stroke machines have an inlet pipe of the same diameter as would be fitted to a 500 c.c. four-stroke single. This when fitted to an engine of something like 225 c.c. is not productive of the most economical results, the jet, of course, being correspondingly large.

In previous issues of *The Motor Cycle* the extraordinary economy of the Velocette has been described and commented on, but I myself have obtained the same economical running from a Connaught. I could always reach well over 100 m.p.g., and the oil consumption was not at all large, but, unfortunately, I cannot now give the exact figure. The petrol system is used on the Connaught, and the makers advise six measures full of oil to one gallon. I have, however, found four to be quite sufficient. A friend owned a two-stroke of another make fitted with a well-known carburetter, which would have done full justice to a 5-6 h.p. single-cylinder of 700 c.c. Naturally, his fuel consumption was more than double mine, less than 50 m.p.g. being about his average.

But, although the two-stroke is economical, I think its working principle far inferior to that of the four-stroke

machine. The intermingling of the fresh gas and the exhaust gas cannot be prevented by any type of deflector, and thereby the mixture is upset, and consequently we do not get the beautifully sharp and powerful explosion of the four-stroke, i.e., a well-tuned four-stroke. I do not consider that the acme of perfection is an even torque. What I like is to feel the powerful "punch" of a T.T. single behind me, and not the even torque of a two-stroke or flat twin, which is no more exhilarating, to my mind, than travelling on an electric tram, where undoubtedly you get an ideal even torque.

L. AGAR.

## WHY DOES AN ENGINE KONK?

Sir,—As an interested reader of the correspondence columns of your excellent paper I have followed the discussions on the subject of konking for the last few years, but have not seen anyone advance the theory which I hold on this subject, namely, that this is caused by pre-ignition—not by the points of sparking plugs being incandescent or by sharp points on projecting objects in the cylinder, but by the same medium that is taken advantage of to fire the charge in the Diesel engine—i.e., the heat of the compressed contents of the cylinders. People familiar with the construction of the Diesel engine are aware that the charge is not fired by magneto or similar device, but the air is compressed to such a pressure (and resultant temperature) that when the fuel is admitted the heat of compression is sufficient to ignite it.

The motor cycle engine has normally a low compression (comparatively speaking), and, consequently, the pressure and temperature are not high enough under ordinary running conditions to ignite the mixture, and ignition does not take place until the spark passes across the plug points. After hard running, however, or climbing a hill, the increased temperature of the cylinder, combined with the heat of compression of the charge in the cylinder, is sufficient to ignite the contents before reaching the end of the stroke, thereby producing a blow on the piston in the direction opposite to its travel. This theory is borne out by the fact that high compression engines are more prone to konking than those with low compression.

I should be glad to have your readers' ideas.

FRANK SMITH.

## SHOCK ABSORBERS.

Sir,—I have read with interest "Wharfedale's" criticism of my article dealing with transmission shock absorbers, but I certainly do not admit that in advocating the friction device contained in the rear wheel sprocket I perpetrated a fatal blunder. The torque delivered to the rear wheel, when ascending a steep gradient on bottom gear, is not so great as the momentary snatch delivered by a gear of four to one at a medium speed. In other words, if the rear wheel shock absorber were adjusted to absorb the snatch of a 4 to 1 gear, it would, with the engine delivering an even torque on its bottom gear, possess sufficient grip to propel the machine up—should we say—Park Rash, a hill with which "Wharfedale" is perhaps familiar. As an analogy, it is an easy thing to hammer a nail into a board, but the same nail would take a mighty lot of pushing in; similarly the rear wheel shock absorber would yield to a sudden blow, but it would require a tremendous constant turning effort to cause it to revolve independently of the wheel.

"Wharfedale" should also bear in mind that very little slip at the rear wheel is effectively equivalent to five or six times the amount at the engine shaft, the proportion increasing as the gear ratio is reduced. If his theory were correct the belt of a step drive would not function at all as a shock absorber when on top gear, unless so slack as to be incapable of propelling the machine at all on full load and its low gear ratios!

With regard to high gear low speed work, I think it is expecting too much of any shock absorber, the adjustment of which is a matter of compromise, to take up such inequalities in the drive—especially in the case of a single. The thump or thrust of such an engine at such a time is quite distinct from the chain snatch which a transmission shock absorber is intended to eliminate, and can only be absorbed by the use of a hand-controlled clutch—as "Wharfedale" suggests—by which the amount of slip can be governed to meet fluctuating requirements.

CHINOOK.



## KEEPING FIT.

In which the writer advocates the heavy sidecar outfit for general use.

THERE have been several comments in *The Motor Cycle* recently on the weight and power of sidecar outfits, and, although the general summing up seems to favour the medium power, I certainly regard a heavier and more powerful outfit as more to my fancy.

My home is in an old rustic, stationless village in the vale of Glamorgan, the nearest market town being Bridgend, about seven miles away. Naturally I find my New Hudson "Big 6" indispensable, especially on market days.

### Coal Mining and "Joy Riding."

I am a collier, and would like to say how amusing are the carpings of those venerable humbugs who write daily in the press about joy riding, waste of petrol, etc. One has to keep fit, and half an hour on the "old 'bus" does more in eliminating the evil effects of the vitiated mine atmosphere than all the drugs in creation.

I find the New Hudson "reliability itself"; it glories in hard work, and loves to slog up inclines, and it is a severe gradient which occasions a drop into second gear.

The handle-bar clutch control I find very useful in traffic. I have substituted the original carburetter for a Binks, and the economy effected thereby has well repaid me; were it only for the simplicity of this carburetter I would readily advocate it. With it the machine runs beautifully on substitute when once it is warm, but, of course, I keep my engine in good tune.

### Electric Lighting.

The head light was made from an old car lamp with the help of the village blacksmith. I use a 40 amp. accumulator, boxed firmly underneath the sidecar seat; the switch I found necessary to conceal from

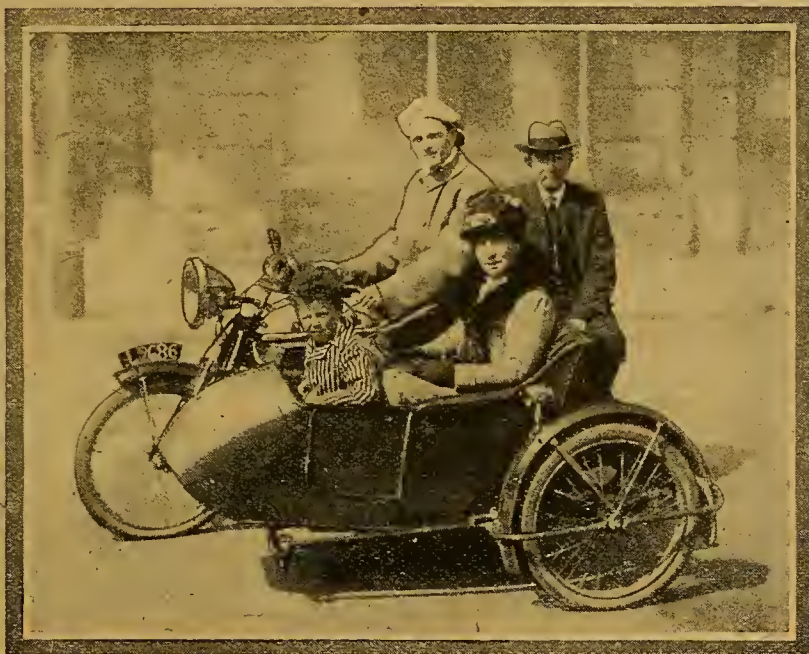
the interested efforts of small boys. Both front and rear lamps are supplied from the same accumulator, but I have connected them in parallel, as I use slightly more current in the head lamp. It may be interesting to know that of all bulbs I have found none to equal the British Thomson-Houston Mazda filaments. I put one of their new half watt bulbs in the head lamp, and, although only 4 volt 1.5 amp., I can almost recognise a man at the distance of two telegraph poles,

while the lamps consume only half the current for this same candle-power. I would like to advise owners of electrically-equipped motor cycles to try them.

### A Week on the "Bummel."

My longest trip was to Bristol via Gloucester, about 130 miles. It was during this "bummel" that I had my first involuntary stop. My petrol pipe broke close to the carburetter. Oh! those pot-holes! The day was the Sabbath, the district a "no man's

land" just this side of Dursley, Gloucestershire. I had no rubber pipe, and insulation tape was useless. I had a cork—never mind its origin—and I cut it and pushed it tight into the bottom of the float chamber. I then took the top of the carburetter off, bent the petrol pipe up and over into it, and made a rough imitation of "top feed," filling the chamber from the tap near the tank. By guiding with one hand, and regulating the flow of petrol with the other, I got to my destination. My fair passenger told me, of course, when the chamber was full enough and *vice versa*—thus no waste. My petrol consumption was just a tank full (two gallons) going, and a little less coming back. I am about 11 stone, passenger 9½ stone, and about 50 lb. of luggage. My time worked out at about 22.7 miles per hour—quite a moderate average but an enjoyable touring speed.



The writer of the accompanying article aboard his well-loaded New Hudson 6 h.p. sidecar. He gives interesting details of his electric head light, which was formerly a car acetylene lamp.





A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

### Dirt in Carburetter.

**Q** I have a 2½ h.p. Calthorpe-Jap, new in December, 1916, and have not done one hundred miles yet. It is fitted with a sight drip feed Best and Lloyd lubricator. This machine when run about two miles misfires and stops. I dismount, change gear, and start up again. This occurs when running in either gear about every two miles. Please tell me what is the matter.—NOVICE.

The trouble is probably due to some obstruction in the flow of the petrol. Make sure that no air lock is occurring either in the tank or the petrol pipe. For the first three or four hundred miles, until the dirt is washed out of the tank, etc., the carburetter will require a periodical cleaning out. To save trouble it is a good plan to half fill the tank with petrol and drain it out *via* the petrol tap, thus removing all foreign matter.

### Crank Case Release.

**Q** My machine is a 2½ h.p. four-stroke. How can I effect a good crank case compression release? I recently fitted a new main shaft on the pulley side, without the hole which was in the old one, through which excess oil was blown on to my left boot. To counteract this, when fitting a new shaft I put a ⅜ in. hole in the shaft on the timing side, but I was obliged to stop it up owing to oil being blown into the timing case and magneto chain case, and thence on to the magneto, which proved fatal. There are still two small holes in the above bearing, from crank case to timing chest, and two holes from timing chest to magneto chain case, through which a considerable amount of clean fresh oil still blows. Should I fit some kind of release direct to the crank case?—E.G.W.

Of course, the oil would naturally do no harm in the timing case. Perhaps you might try opening it again and fitting a short copper pipe from the timing case, carrying it away clear of the engine, so that any excess of oil is blown on to the ground. This would ensure the timing wheels receiving an adequate supply of lubricant and yet keep the magneto clear. If, however, after doing this, you still get oil on the magneto then you would have to buy a relief valve and fit it on to some convenient part of the crank case. A release is not, of course, essential, but without it oil is likely to be forced out of the joints.

### Incorrect Mixture.

**Q** I have a 4 h.p. single, to which is fitted a Senspray carburetter. I have tried all sizes of jets, from the smallest to the largest, bound all joints with insulating tape to prevent any air leaks, but have been unable to prevent my engine from eight-stroking. I might add that I cannot give any air until the throttle is three parts open.—H.G.H.

As you have tried various jets your trouble is probably due to the petrol level in the carburetter being wrong. Has the clip on the needle, against which the float bears, by any chance been replaced wrong way up? The level can be raised by placing one or more small brass washers on the top of the clip, or lowered by placing some light packing, such as a mica washer, between the clip and the float.

### IMPORTANT NOTICE.

#### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

### Unsatisfactory Running.

**Q** (1.) I possess a 1913 3½ h.p. Rudge Multi. I run on an average 100 miles per week, without trouble, but when going along nicely the engine will suddenly become sluggish, and no amount of coaxing by changing gear or altering the controls will induce it to go, and it will eventually stop; but if I raise the exhaust for a second, and drop it suddenly, it will go forward with a plunge. What is the cause? (2.) I can get only 50 m.p.g. I use a 44 jet Senspray, and a smaller one is of no use. I always run on petrol. Could you suggest any improvement to obtain better consumption? (3.) Should it be capable of taking a light coachbuilt sidecar, with passenger, in S. Wales district, which, as you are aware, is very hilly?—W.C.

(1.) The symptoms you describe are rather curious. It seems to us that there may be a possibility of the carburetter flooding badly, and that you are running

on too strong a mixture. The fact of raising the exhaust allows an excess of petrol to be expunged from the cylinder, and stopping the suction on the jet allows the machine to recover itself. Again, the trouble may be due to the exhaust valve stem sticking slightly in its guide and preventing the valve closing properly, or to the same effect caused by the exhaust valve tappet sticking in its guide owing to insufficient oil reaching it. (2.) Overhaul the petrol system carefully, see that there are no leaks, and also do not fill your tank too full. Look over the timing, and see that the carburetter is not flooding. (3.) The machine should take a sidecar not exceeding 100 lb. all on.

### Too Large a Jet.

**Q** I have a 3½ h.p. 1912 T.T. Triumph. No matter how I regulate the control levers I cannot open the throttle any more than a third without choking my engine. I have overhauled the timing, magneto, and carburetter, and so far as I can see everything is all right.—R.G.T.

We think that if you fit a smaller jet you will be able to open the throttle to its fullest extent. You might try new valve springs.

### Valve Timing.

**Q** I should be obliged if you could inform me what difference there should be in the timing of a twin V engine to give the best results. (1.) I understand that one of the cylinders should be a little later in opening and closing of the valves. Which cylinder is this? (2.) I have a 1913 8 h.p. J.A.P. The timing of the cylinders is: Front—inlet opens dead top; inlet closes 20° past bottom centre = ⅜ in. up; exhaust opens 52° before bottom centre = ⅝ in.; exhaust closes 15° over top centre. Back—inlet opens 5° before top centre; inlet closes 10° over bottom centre = ⅜ in. (bare) up the stroke; exhaust opens 54° before bottom centre = ⅝ in. full (nearly ⅞ in.); exhaust closes 5° over top centre. The back cylinder has 5° to 10° advance over the front one. Is this correct, or should it be the same as the other, or should the front cylinder have the earlier opening and closing?—R.W.B.

(1.) The front cylinder may be slightly further advanced than the back. (2.) The timing of both your cylinders is too far advanced. If you time your back cylinder as your front one is now timed, it will give you just about the correct proportion on both of them.



**Converting an Old Machine.**

**?** I should be glad if you would kindly give me some information on the following points: I have a Minerva four-stroke, fixed engine 4 to 4½ h.p., direct belt drive, to which I wish to attach a sidecar. (1.) I should be glad to know if the belt drive would be sufficient, or should I convert the machine into chain drive? (2.) I also want the machine to start from standstill without having to run a distance to make it fire. I do not want a costly article.—M.C.N.

(1.) A direct belt drive is not very satisfactory for sidecar work. You would probably experience a good deal of transmission trouble. (2.) We cannot recommend you to spend money in attempting to convert an old machine—designed and made for solo use—for the attachment of a sidecar. The ultimate results might not prove satisfactory, and the machine would be worth little or no more when you came to sell it. A governor pulley or an engine shaft gear might prove a useful compromise, and by the latter you would be able to start the machine by jacking it up on the stand and pedalling, the gear in high, then putting the control in neutral and starting off on low gear in the ordinary way. If you wish to use a sidecar your wisest plan would probably be to sell your present mount and buy one better adapted to the work.

**Licences on Borrowed Machines.**

**?** A short time ago a friend of mine came over on his motor cycle to see me, and left the machine at my place. I had three runs of one mile, two miles, and forty miles. I have not had a motor cycle of my own for three years—but hold a driver's licence. The local police sergeant saw me on this machine, and he informs me that he is summoning me for riding without a Revenue licence. I should add that the machine was left with me twelve days; my friend is in the army—Staff-Sergt.—and is drafted about the country, and I cannot find him to ask if he has a Revenue licence. If not, am I responsible for him not taking one? Honestly, I do not know.—E.W.

Our legal adviser replies as follows: "The licence duty has to be paid by the one who keeps the motor cycle, and not necessarily by the party who uses it. I cannot see that there has been any case decided on facts anything like those given by your correspondent. I can hardly imagine that any Court would hold that he is keeping a motor cycle because a friend lent him one for twelve days, and I think it must be held that it was the owner who kept the motor cycle and simply allowed his friend to use it. If this be so, the fact that the owner had not taken out the annual licence does not affect your correspondent. If your correspondent had paid something for the use of the motor cycle, it would have been quite clear that the licence had to be taken out by the owner. This is provided for by Act of Parliament, in case of hirers of motor vehicles from garages."

**Metal for Engine Bearings.**

**?** I am thinking of rebushing my J.A.P. engine; and as phosphor bronze is difficult to obtain, I must resort to other metals. (1.) Would ordinary brass be suitable, or would mild steel or cast-iron be better? (2.) Can flywheels be satisfactorily set again (after having been taken down to renew big end) by scribing a line on the flywheels on opposite side to big end pin and setting with a straight-edge, or is it necessary to reassemble in lathe centres?—O.P.B.S.

(1.) Brass or white metal would be best for the purpose. We would not recommend you to use steel, as it would seize instantly if short of oil. (2.) A special jig is really necessary for resetting the flywheels, and we do not think you could manage it by the use of scribes and a straight-edge. You might obtain the correct centres by the careful use of a lathe.

**Testing a Second-hand Machine for Wear.**

**?** I am thinking of buying a second-hand 3½ h.p. o.h.v. three-speed clutch model Brough, but being a novice I should be obliged if you would tell me how and where to look for wear and any other faults. You will probably tell me to try the bearings, but what I want to know is how to.—J.C.O.

Try the bearings in the following way: Take the flywheel by grasping it with one hand on the top and the other at the bottom, then try lifting it, when, if the chain is reasonably slack, you will notice if there is any shake in the main bearing. Then by rotating the flywheel backwards and forwards; when the cylinders come up against compression, you will be able to tell if there is any shake in the connecting rod bearings. To make absolutely certain you would, of course, have to dismount one of the cylinders. Test the valve rockers by taking the rocker between the finger and thumb, when the pressure is off the valve, and see if there is any shake in the overhead mechanism throughout, and do the same with the tappets. Jack both wheels off the ground and note if there is any shake in the wheel bearings or the steering head. Note also that the wheels are tracking truly.

**An Oval Cylinder.**

**?** (1.) What is a rat-trap carburetter? (2.) I have heard that in aero engines the cylinders become oval through irregular cooling, and that brass rings are used to prevent this. If that is so, could I use these brass rings in my motor cycle engine, the cylinder of which has worn oval? (3.) May I use ordinary paraffin without a petrol licence?—W.J.M.

(1.) The term "mouse-trap" is sometimes used in connection with the type of carburetter in which the air intake operates in much the same manner as the door of a mouse-trap, as in the Binks racing carburetter. (2.) A special design of brass piston ring is used in certain aero engines—not to prevent warping, but to stop the escape of gases past the piston in case warping occurs. It is so arranged that the pressure of the gas above it tends

to open the ring; but we do not think this arrangement could profitably be applied to your engine. If the cylinder is worn oval, reboring is the only proper remedy. (3.) It is illegal to use paraffin unless it be entered on one's permit in the same way as petrol.

**READERS' REPLIES.****Lubricating Enclosed Fork Springs.**

In *The Motor Cycle* of June 21st, on page 580, I see a Rudge rider has been asking how to lubricate the front fork spring. The following is a simple method I adopted on an old machine and no further attention to this point has been necessary for over three years. The machine was first propped up by means of a box underneath the silencer in such a manner that the front wheel was clear of the ground and the fork spring and telescopic tube extended as much as possible. A small hole (about ¼ in.) was then drilled in the bottom spring tube as high as possible and in such a position that it was covered by the top spring tube when the machine was resting normally on the ground. Hot vaseline was then forced into this hole by means of the grease gun. Speaking from experience, I would strongly recommend your correspondent not to attempt to dismantle the front fork spring on his machine. The spring on my machine required renewing, and whereas the rest of the Rudge machine is delightfully accessible the front fork spring appeared to me at the time to be exactly the opposite.—D. E. NEWITT.

**Bending Handle-bars.**

Seeing "G.R.'s" question in *The Motor Cycle* of June 21st as regards bending his 1912 Triumph handle-bars from touring to semi-T.T., I thought I would write to let you know it can be done without an expert. My mount is a 1912 Triumph, and I recently bent mine over a gas ring, and was pleased with the result, and I may say that the heat did not interfere with the plating. The bars were heated and pulled outwards first, then put in the machine and heated again, placing a wooden wedge underneath and giving them two or three taps with a mallet. If "G.R." is within a reasonable distance of Peterborough I shall be pleased to show them to him.—EUSTACE WM. BROWN.

**EXPERIENCES WANTED.**

"H.J." (Honiton).—Philipson or Grado pulley on a 1909 Rex.

**RECOMMENDED ROUTES.**

LLANGOLLEN TO NORTHAMPTON.—J.O.J.  
Llangollen, Chirk, Shrewsbury, Much Wenlock, Bridgnorth, Kidderminster, Bromsgrove, Headless Cross, Alcester, Stratford-on-Avon, Warwick, Leamington, Southam, Daventry, Weedon, Northampton. Approximately 130 miles.

LONDON (EAST DULWICH) TO FARINGDON.—H.G.W.

Dulwich, Herne Hill, Acre Lane, Clapham Park Road, Battersea Rise, Upper Richmond Road, Richmond, Hounslow, Cranford, Slough, Maidenhead, Henley, Wallingford, Wantage, Farringdon.





### Sidecar Springing.

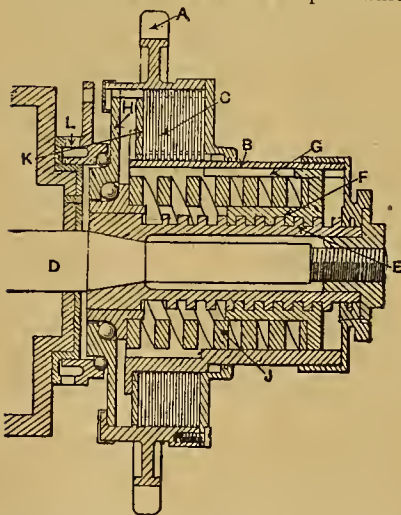
In most cases the springs supporting the body of a sidecar are arranged on either side of the body in such a way as to give lateral support, and this, of course, increases the width of the sidecar with a body of given dimensions. The construction here shown comprises a built-up leaf spring, the lower member of which is attached to the main tube of the sidecar chassis, whilst the other is attached direct to the under-surface of the body. The body, therefore, can be



of the same width as the total space between the outer edges of the springs, enabling either a narrower construction to be produced, or a wider body to be fitted for a given width of sidecar chassis. It is stated that the particular construction of spring shown provides sufficient lateral stability, so that a neat and simple construction is arrived at.—C. T. B. Sangster, No. 104,749.

### Shock-absorbing Clutch Mechanism.

The invention illustrated comprises a plate clutch, with which is combined a resilient transmission device, a single spring serving both for the clutch and the spring drive. The chain sprocket A is connected to the sleeve B by a plate clutch C. On the countershaft D is fixed a screw-threaded sleeve E upon which

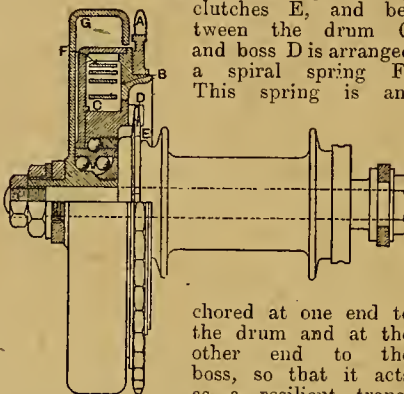


works a nut F, the outer edge of which engages splines G on the sleeve B. Between the nut F and a plate H is arranged a helical spring J. This spring acts through the plate H to press the sprocket A to the left, causing the clutch plates to abut against the stop K, and so engaging the clutch. At the same time, power transmitted from the countershaft D to the sleeve B or vice versa must necessarily

pass through the worm and nut device EF, and consequently violent shocks, instead of being transmitted from one member to the other, are absorbed by the spring J. This increases the spring pressure on the clutch plates, so that slipping is prevented. The clutch is disengaged by the cam ring L when required.—G. E. Stanley, No. 106,171.

### Spring Drive Mechanism.

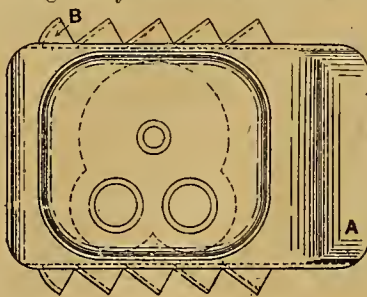
The device is applied to a hub, the sprocket A being carried by a ring B, which is connected to a drum C at its outer edge, and free upon a boss D on its inner edge. This boss transmits the motion to the hub shell by the dog clutches E, and between the drum C and boss D is arranged a spiral spring F. This spring is an-



chored at one end to the drum and at the other end to the boss, so that it acts as a resilient transmission between the sprocket and the hub shell. The outer surface of the drum serves for the band brake, and this brake is enclosed by a stationary casing G secured against rotation in the fork end.—D. Levy, No. 105,358.

### Cooling Device and Trouser Guard.

There have been a considerable number of inventions relating to cooling devices for application to motor cycle engines, and the illustration shows a simple arrangement, the large view being a plan showing the cylinder in dotted lines. The



device comprises a cowl A, the sides of which are formed with louvres D facing the direction of travel, so that the air is caught and deflected on to the cylinder. The section shows the method of attachment of the cowl beneath the engine valve cap C. The plates of the cowl are indicated at D, and it will be seen that these act as radiating fins, and keep the temperature down in the neighbourhood of the valve caps.—F. M. Fletcher, No. 105,003.

### AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average. The word "combination" indicates a sidecar outfit as supplied complete by the makers.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C.	1914	3½ 2-speed	£40	£40
A.J.S.	1916	6 combination	£92	£92
"	1914	6 combination	£49	£49
"	1916	4 combination	£78	£78
Allon	1916	2½ 2-speed	£30	£30
"	1914	2½ 2-speed	£28	£28
Ariel	1915	3½ 3-speed	£37	£45
"	1914	5-6 combination	£51	£51
Bat	1914	6 3-speed	£48	£48
Bradbury	1914	4 2-sp. sidecar	£43	£43
Brough	1916	3½ 2-speed	£56	£56
"	1915	3½ 2-speed	£46	£46
B.S.A.	1916	4½ sidecar	£74	£62
"	1915	4½ sidecar	£58	£57
Calthorpe	1916	2½ 2-speed	£30	£31
"	1915	2½ 2-speed	£29	£25
"	1916	2½ 2-stroke	£25	£26
Clyno	1915	2½ 2-stroke	£25	£27
"	1914	6 combination	£62	£62
Connaught	1915	2½ 2-stroke	£25	£25
Douglas	1916	2½ 2-speed	£46	£47
"	1915	2½ 2-speed	£44	£40
"	1914	2½ 2-speed	£33	£33
Enfield	1916	6 combination	£85	£83
"	1915	6 combination	£63	£63
"	1916	3 2-speed	£39	£45
H.-Davidson	1916	7 combination	£84	£84
"	1915	7 combination	£72	£66
Henderson	1916	7 combination	£100	£100
Hazlewood	1914	6 3-speed	£39	£39
Humber	1915	6 combination	£60	£60
Indian	1916	5 combination	£65	£64
"	1916	7-9 combination	£70	£80
"	1915	7-9 combination	£66	£65
James	1916	4½ combination	£68	£70
"	1916	2-sp. 2-stroke	£31	£31
Lea-Francis	1916	3½ 3-sp. sidecar	£67	£67
Levis	1916	2½ Popular	£26	£26
"	1915	2½ Popular	£20	£22
Matchless	1915	7 combination	£70	£70
New Hudson	1916	2-sp. 2-stroke	£28	£28
"	1916	4 combination	£48	£48
New Imperial	1916	2½ 2-speed	£32	£32
"	1915	2½ 2-speed	£24	£24
Norton	1915	6 2-speed	£52	£52
"	1915	3½ T.T.	£45	£45
O.K.	1916	2½ 2-stroke	£20	£20
P. & M.	1915	3½ combination	£65	£65
"	1914	3½ combination	£52	£52
Premier	1915	2½ 3-speed	£28	£28
"	1914	3½ 3-speed	£45	£45
Rover	1916	3½ 3-speed	£52	£52
Royal Ruby	1916	2½ 2-stroke	£24	£24
Rudge	1916	3½ Multi	£46	£46
"	1915	3½ Multi	£35	£35
Scott	1916	3½ combination	£60	£60
Sun	1915	2½ 2-speed	£23	£23
Sunbeam	1916	8 combination	£108	£99
"	1916	3½ solo	£72	£72
"	1915	3½ combination	£80	£80
Triumph	1916	2-sp. 2-stroke	£37	£36
"	1915	4 countershaft	£55	£55
Velocette	1916	2½ 2-sp. 2-stroke	£30	£30
"	1915	2½ 2-sp. 2-stroke	£25	£25
Zenith	1915	8 Gradua	£62	£62

### The Cameta Rubber Co.

The Cameta Rubber Co. have acquired the business of the Para Rubber Co., and are continuing business at the address, 93, John Bright Street, Birmingham, where a new stock of garments in all the latest styles is carried.

### A Vulcanising Handbook.

Motorists who own vulcanising plants should write for the new edition of the Dunlop vulcanising handbook. Address Advertising Department, Dunlop Rubber Co., Ltd., Aston Cross, Birmingham.





**There's nothing like it**

—nothing in belts that can approach the JOHN BULL DEEP DRIVE—

We know, because we've seen and tested the others and—if you've done the same we think we know the belt you use to-day—it's the

**JOHN BULL**

—the belt with wonderful gripping power—a merit entirely worthy of its name, a merit created by its unique construction—deeper sides and a registered raised top which ensures their full utilization and 15% to 33% more driving surface than is usual.

And there are many other points just as valuable—so ask your Agent about it.

Leicester Rubber Co., Ltd., Leicester.

Abingdon

“**KING DICK**”  
MOTOR CYCLES &  
ENGINES



Abingdon  
Ecco, Ltd  
Abingdon Works  
Tyseley  
Birmingham

Orders dealt with as H.M. Government Requirements permit.

Goldbolds

London:  
G. H. SMITH,  
12, Mortimer St.,  
W.

*In answering these advertisements it is desirable to mention "The Motor Cycle."*

A17



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd., and crossed** & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**A** BINGDON King Dick, late 1914 combination, 5-6 h.p., 3-speed, Gloria sidecar, excellent condition; £58.—Griffin, 89, Gt. Portland St., W.I. [4761]

**A** BINGDON, 3½ h.p., single-speed, adjustable pulley, Bosch mag., pan seat saddle; £30; E.P. or exchange.—Service Co., 292, High Holborn, London. [4825]

### A.J.S.

**A** J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

**A** J.S. 1914 Combination, 3-speed, chain transmission, free engine, complete with accessories; £65.—Wauchope's, 9, Shoe Lane, London. [4740]

**A** J.E. 6h.p., 1914 model, complete with business sidecar, excellent condition, 3-speed, clutch, and kick starter; £55.—Hopkins, New St., Ledbury. [X2061]

**A** J.S. 1915, 2½ h.p., 3-speed, clutch, Lucas head light and horn, tools, sound tyres, splendid condition and running order; £45; guaranteed.—Wauchope's, 9, Shoe Lane, London. [4739]

**1913 A.J.S.**, 6h.p., 2-speed, clutch, kick starter, with sporting coachbuilt sidecar, lamps, horn, etc.; accept £45, or exchanges.—Newham, 223, Hammersmith Rd., W.6. Phone: 80. [4872]

**A** J.S. 1915, 2½ h.p., 3-speed, clutch, T.T. bars, P. and H. head lamp, generator, rear lamp, tools, sound tyres, machine perfect throughout; £43/10.—Advertiser, 156, Gt. Portland St., W.I. [4203]

## Push! Push! Push!

It's a troublesome job pushing the bike—yet it may easily be your lot if the fastener fails—But why let it?—why not fit the

## FORWARD—

the fasteners that never fail.

There are several models dealt with in our New Catalogue—ask for copy, and note the patterns illustrated below:

**THE FORWARD** .. .. 1/6

**THE KING HOOK—**

Detachable .. .. 1/-

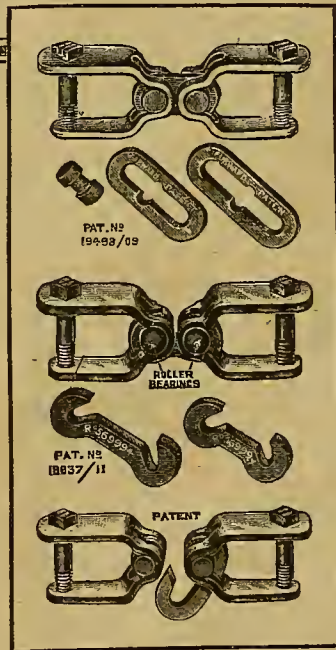
Adjustable .. .. 1/3

**THE CHAMPION—**

Detachable .. .. 9d.

Adjustable .. .. 1/-

**FORWARD MOTOR Co.,**  
35, Forward Wks., Summer Row,  
**BIRMINGHAM.**



## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### Alldays.

**1917** Allon 2-stroke, brand new; £39, to clear. Missin, Cotingham, Hull. [X207]

**COLMORE** Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [X075]

**NEW** Allons, 2-stroke, 2½ h.p., £42; 2% only for cash terms.—Wauchope's, 9, Shoe Lane, London. [474]

**A** LLDAYS Matchless, 2½ h.p., 2-stroke, first-class condition; £20.—Hopkins, New St., Ledbury. [X206]

**A** LLDAYS Matchless, 2½ h.p., 3-speed, 1914; £25. H. J. Marston, 50, Argyle St., Birkenhead. [211]

**A** LLDAYS, 3½ h.p., 2-speed, in excellent condition; £30.—Penwarden, Durrington, Salisbury. [X214]

**1914** 3½ h.p. 2-speed Alldays Matchless, excellent condition; £30, offers.—Parker and Son, St. Ive Hunts. [477]

**A** LLDAYS Matchless, 2½ h.p., 2-stroke, 3-speed gear, new condition, lamps, etc.; £25.—Hopkins, New St., Ledbury. [X206]

**A** LLON, single and 2-speed, at old prices; buy now and save money.—Paskells, 44, Finsbury Pavement, E.C.2. [461]

**A** LLDAYS Allon, 2-speed, £36; Alldays Allon £32/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [483]

**A** LLDAYS Allon, used few months only, perfect running order, scarcely soiled; owner joined up; £22.—Blyford Lodge, 49, Sheen Rd., Richmond, S.W. [451]

**A** LLDAYS Allon, single-speed £36, 2-speed £44, 2-speed and hand clutch £45, new; E.P. or exchange.—Service Co., 292, High Holborn, London. [483]

**A** LLDAYS Matchless, 1914, 3½ h.p., 3-speed countershaft, coachbuilt sidecar, in good condition, chain driven; £35.—Percy and Co., 337, Euston Rd., London. [481]

**A** LLDAYS Allons, all latest models actually on show, also big stock of pedal cycles, best makes, Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [451]

### Ariel.

**A** RIEL, 3½ h.p., 1917, 3-speed countershaft model in stock.—Crow Bros., Guildford. [25]

**COLMORE** Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [107]

**A** RIEL, 3½ h.p., free engine, in first-class order, excellent condition; £16.—Percy and Co., 337, Euston Rd., London. [481]

**1917** Ariel, 3½ h.p., 3-speed countershaft, not used; £65, list £72; exchanges.—10, Bartholomew St., Ipswich. [46]

**A** RIEL, 1916, 3½ h.p., 3-speed countershaft, coachbuilt combination, all accessories, little used; £25.—97, Malvern Rd., West Kilburn. [47]

**GREAT** Bargain.—3½ h.p. Ariel, 1911, Bosch magneto, semi T.T. bars, very fast and powerful, tyres good, sacrifice £12.—32, Holywell Cross, Chesterfield. [X202]

**1914** Ariel, 3-speed countershaft, kick start, purchased 1915, coachbuilt sidecar, lamps, excellent condition; £45, offers.—Parker and Son, St. Ive Hunts. [47]

**A** RIEL, Latest 1917 3½ h.p. Combination actually in stock, £93/10; also big stock of pedal cycles, best makes.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [451]



## MOTOR CYCLES FOR SALE.

## Auto-Wheels.

**AUTO-WHEEL De Luxe**, nearly new, £9, or by gradual payments.—248, Bishopsgate, London. [4768]

**WALL Auto-Wheel**, good condition; £7/10.—R. Burdon, 13, Fowler Terrace, Hendon, Sunderland. [X2137]

**MODEL de Luxe Auto and Triumph Cycle**, 2-speed, good condition; £12.—3, Snnburgh Rd., West Side, Clapham Common, S.W.12. [X2056]

**GENUINE WALL Auto-Wheel**, complete, splendid condition and running order; £8/10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X2050]

**AUTO-WHEEL** for sale, just overhauled by Motosacoche, Ltd., splendid condition; £7.—Apply, Kenmont Works, College Park, Willesden Junction, N.W.10. [4799]

**NEW 1915 Auto and best bicycle**, Eadie coaster, Magnam tyre, Lucas lamps, shock absorber, etc., guaranteed perfect condition; £14, or Auto itself £8.—Woodford, 36, Ashvale Rd., Tooting. [4494]

## Bat.

**1913 Bat-Jap**, 5-h.p., underslung combination, 2-speed countershaft, kick starter, 650x65 tyres, spares; any trial; £38, no offers; exchange Triumph 3-speed combination.—111, Grove Lane, Camberwell, S.E.5. [4500]

**BAT-J.A.P.** Grey Sporting Combination, 1915, 6-h.p., o.h. valves, aluminium cooling fins, countershaft 2-speed, hand and foot controlled, Binks 3-jet, Empire enclosed chassis S.O., flap, screen, etc., 31a. tyres, lamps, speedometer, absolute perfect order, 72 m.p.g. guaranteed, sacrifice £55; no offers.—Lee, 30, Cholmeley Rd., Reading, Berks. [4605]

## Bradbury.

**BRADBURY**, 4-h.p., with N.S.U. gear, sidecar, lamps, and tools; £24.—Serase, 381, Battersea Park Rd., W. [4659]

**BRADBURY and Sidecar**, wicker, N.S.U. 2-speed gear; £42; E.P. or exchange.—Service Co., 292, High Holborn, London. [4830]

**BRADBURY**, 3½-h.p., lamps, horn, Palmer cord tyres, and coachbuilt sidecar; sacrifice 25 gns.—11, Lomenade, Mill Hill, N.W. [4606]

**1914 4-h.p. Bradbury and Phoenix coach sidecar**, 3-speed, free engine, Sturmer-Archer, kick start, speedometer, lamps, and horn; £35; seen by appointment.—F.M., 22, Vale Rd., Finsbury Park. [4795]

**1913-1914 Bradbury**, 4-h.p., N.S.U. 2-speed gear, Bosch mag., speedometer, B. and H. lamps, mirror, and coachbuilt sidecar, splendid condition; £34.—Apply, Kates, 35, Raymouth Rd., South Bernoudsey, S.E.16. [4521]

## Brough.

**1916 Brough**, 3½-h.p., T.T., 2-speed, as new, speedometer, lamps, all accessories, exceptionally fit; £50; combination wanted.—Watson, 14, Eld Grove Rd., Cranborough, Hants. [4506]

**BROUGH**, 1915, 3½-h.p. flat twin, Model H.O., Sturmer-Archer 3-speed countershaft, hand controlled clutch, Binks carburettor, with special heating for carburettor and induction pipe, 2½ in. Dunlops electrically lit, Lucas horn, first-class condition; £50.—Box 1,027, The Motor Cycle. [X2041]

## Brown.

**BROWN**, 3½-h.p., wicker sidecar, good going order, nearly new, Kempshalls, and wicker; £12/10.—Sales, 18, Cross St., Newark. [X2082]

## B.S.A.

**COLMORE Depots**, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798]

**B.S.A.** New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888]

**B.S.A.**, 1917 Model K., with coachbuilt sidecar, lamps, horn, etc., been driven few hundred miles only; £5.—A. L. Pitts, Redditch. [X2132]

**B.S.A.**, 1915 Combination, 4½-h.p., 3 speeds, countershaft, all chain drive, in real nice condition; £58. Percy and Co., 337, Euston Rd., London. [4804]

**1917 B.S.A.** in stock. Catalogues free. Spare parts per return. Lin. belts, as fitted by makers, 6/6, sent paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529]

**B.S.A.** Oct. 1916, as new, chain-cum-belt, with smart C.B. sidecar, wind screen, and all accessories; £70. Kiaghman, Electricity Works, Kingston-upon-Thames. [4549]

**1913 B.S.A.**, 2-speed, with Canoelet coachbuilt sidecar, speedometer, lamps, horn, complete; £35.—Swanham, 223, Hammersmith Rd., W.6. Phone: 80. [4669]

**1914 B.S.A.**, 4½-h.p., 3-speed countershaft, with 8 gallon petrol licence, fully equipped, fast and reliable; any trial; 38 gns.—22, Fort St., Bishopsgate, O. [4792]

**B.S.A. and Sidecar**, Model H., 4½-h.p., new March, 1916, splendid condition, 3 speeds, countershaft and all chain drive; £55.—Bond, 245-247, Euston Rd., W.1. [4592]

**1916 B.S.A.**, perfect condition, 2-speed, 4½-h.p.; price 48 gns.—Juliana, 84, Broad St., Reading. [0911]

# DRUID

## Shock Absorption

The power of the DRUID MARK II. Spring Fork to totally absorb ALL shocks incidental to "bad roads" — and the lively sense of SECURITY and COMFORT necessarily imbuing the rider of the DRUID-equipped machine — are primarily

## Due to the DRUID dual springs

These admittedly stand as the foremost expression of scientific Fork design — the upper Horizontal member operating in perfect unison with the lower Vertical member (as shown below), together to absorb all vibration within the Fork itself.

The judgment of "Experience" is unanimously in favour of the DRUID — so complete, so dependable, and — so lasting.

Ask for full details.

**A. Drew & Co. Ltd.**  
Leopold St., B'HAM.



The DRUID MARK II  
Made in 3 models — Solo or 5'car.

## MOTOR CYCLES FOR SALE.

## B.S.A.

**B.S.A.**, 4½-h.p., 1916 model, 3-speed, clutch, and kick start, complete with Canoelet coachbuilt sidecar, speedometer, lamps, etc., new condition; £65.—Hopkins, New St., Ledbury. [X2062]

**B.S.A.**, 1916 Coachbuilt Combination, 4½-h.p., 3 speeds, expensively equipped, scarcely soiled, just in the pink; £65.—Bunting's Second-hand Showrooms, Mason's Av., Harrow. [4703]

**1917 B.S.A. Model H.**, 3 Lucas lamps, horn, Moat-gonery special sidecar, hood, screen, luggage grid, fine condition; £80; exchange Enfield, Matchless, etc.—Box 1,031, c/o The Motor Cycle. [X2065]

**4½-h.p. B.S.A.**, 1916 model, 3-speed, fitted with Canoelet jet sporting sidecar, 3-speed gear, all chain drive and free engine; the combination complete, £60, guaranteed.—Wauchope's, 9, Shoe Lane, London. [4735]

## Calthorpe.

**1916 Calthorpe**, 2-stroke, 2-speed; exchange good 3½-h.p.—1, Candy St., Bow. [4626]

**COLMORE Depots**, Birmingham, Manchester and Liverpool, for Calthorpe motor cycles. [0799]

**CALTHORPE**, 2-strokes, single, and 2-speeds; cheap for cash.—Paskells, 44, Finsbury Pavement, E.C.2. [4679]

**1915 2½-h.p. Calthorpe-Precision**, Enfield countershaft 2-speed gear; £26/10. Motor Exchange, 68, Horton St., Halifax. [4608]

**CALTHORPE-J.A.P.**, 2½-h.p., Enfield 2-speed, Senspray carburettor; £35; E.P. or exchange.—292, High Holborn, London. [4827]

**CALTHORPE Motor Cycles**.—All models in stock for immediate delivery.—P. J. Evans, 87-91, John Bright St., Birmingham. [X2066]

**1916 Calthorpe**, 2-stroke, 2-speed, plating and tyres perfect, little used; £26.—H., 28, Brigstock Rd., Thornton Heath. [4716]

**CALTHORPE**, 2-stroke, 1917, latest model, Enfield 2-speed; 33 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [4572]

**CALTHORPE-J.A.P.**, 1917, latest model, brand new, Enfield 2-speed, in stock; 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [4571]

**1915 Calthorpe** 2-stroke, countershaft 2-speed, E.E. footboards; 17 gns. for immediate sale.—Newman, 223, Hammersmith Rd., W.6. Phone: 80. [4675]

**CALTHORPE**, 2½-h.p., Enfield 2-speed, new Dunlops, belt, tubes, Amac, Enfield mag., horn, lamp, good condition; £18.—Bird, Stapleford, Cambs. [X2139]

**CALTHORPE-J.A.P.**, new September, 1915, not ridden 500 miles; ditto, with 2-speed gear; both owners on active service; what offers.—Box L5,915, c/o The Motor Cycle. [4748]

**2½-h.p. New Calthorpe-Japs**, £39/18, fitted with the 24 noted Enfield 2-speed gear and free engine; easy payments 2% only charged for the convenience.—Wauchope's, 9, Shoe Lane, London. [4736]

## Campion.

**3½-h.p. Campion-Peugeot**, variable pulley, runs parallel; £15.—62, Victoria Rd. S., Southsea. [4766]

**1914 Campion-Jap**, 3-speed, clutch, Sturmer-Archer, 24 in. wheels, new belt, climbs anything with passenger, engine requires overhaul; £22/10.—C. Wallis, 94, Hewson Rd., Lincoln. [X1937]

## Centaur.

**16 Gas.—Centaur**, guaranteed all round, perfect riding condition, chain drive, 3½-h.p., 120 to gallon, tools, etc.—Miller, 62, Hampstead Rd., N.W.1. [3992]

## Chater-Lea.

**CHATER-LEA**, 3½-h.p., strong, serviceable machine, Bosch mag., B. and B. carburettor, Brooks saddle, Dunlop tyres, Druid spring forks; £12, bargains.—Pawcett, Holme, Hawes, Yorks. [4559]

## Chater-Lea-Antoine.

**5-h.p. Chater-Lea Twin Antoine Combination**, 2-speed, all hand controlled; a week's trial allowed against cash, £25.—41, Wren St., Hyde Rd., Manchester. [4590]

## Clyno.

**LATE 1914 Clyno**, 2-stroke, perfect order, 2-speed, h.h.c.; £26; a quantity of petrol; exchange highest power.—Scott, Springwell, Gateshead-on-Tyne. [X2109]

**CLYNO War Office Combinations** for immediate delivery from Colmore Depot, Birmingham and Manchester; inclusive price with spare wheel, 100 gns. [0884]

**CLYNO**, 1914-15, 6-h.p. engine, kick-starter, and 3 speeds, with coachbuilt sidecar, a very powerful combination; £68/15; E.P. or exchange.—Service Co., 292, High Holborn, London. [4835]

**CLYNO**, 1914, 6-h.p., No. 6 sidecar, B.B. pilot jet, detachable wheels, speedometer, Lucas horn, electric light, Pillion seat, luggage carrier; trial; £60.—26, Warrender Rd., Tufnell Park. [4546]

## Connaught.

**CONNAUGHT**, 2½-h.p., 1916, 2-speed, a thoroughly reliable 2-stroke; £35; E.P. or exchange.—Service Co., 292, High Holborn, London. [4822]



## MOTOR CYCLES FOR SALE.

## Connaught.

CONNAUGHT Miniature, single-speed, £28/17/6; standard 2-speed, £45/2; new; E.P. or exchange.—Service Co., 292, High Holborn, London. [4837]

CONNAUGHT, 1916, 2-strokes, complete with head lamp, generator, rear lamp, horn, etc., only done small mileage; bargain, £26.—Advertiser, 156, Gt. Portland St., W.1. [4486]

## Corah.

CORAH, 1914, 2½ h.p., 2-stroke, 2-speed; £18.—248, Bishopsgate, London, E.C. [4769]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new, 42 gas.; E.P. or exchange.—Service Co., 292, High Holborn, London. [4838]

COVENTRY Eagle, late 1915, 2½ h.p., 2-stroke, lamps, accessories, excellent order; bargain, £22.—Hardman, 6, Alma St., Atherton, Manchester. [X1987]

## Diamond.

1914 2½ h.p. Diamond, 4-stroke, countershaft 2-speed, handle-bar controlled clutch, Hutchinson tyres, not done 500 miles, guaranteed as new; £27.—The Premier Motor Co., Aston Rd., Birmingham. [4652]

## Douglas.

DOUGLAS, 2½ h.p., brand new, 3 speeds.

DOUGLAS, 2½ h.p., 1915, 3 speeds; £45.

DOUGLAS, 2½ h.p., 1914, 2 speeds; £36.

DOUGLAS, 4 h.p., 1914, 2 speeds, combination; £55.—Percy and Co., 337, Euston Rd., London. [4802]

DOUGLAS T.T. Model, 2-speed; £32/10.—Wauchope's, 9, Shoe Lane, London. [4737]

DOUGLAS, 2½ h.p., 1915, nice condition; £39.—Griffin, 89, Gt. Portland St., W.1. [4762]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, in fine running order; £16, a bargain.—At Popplewells, Woodbridge Rd., Ipswich. [X1420]

1913 Douglas, 2½ h.p., 2-speed, clutch, and kick start; £30.—69, Peckham Rd., London, S.E. [X2045]

DOUGLAS, 2½ h.p., a.v., runs well, good tyres; 10 gas., lowest.—Scrase, 381, Battersea Park Rd., S.W. [4640]

2½ h.p. Douglas, 1915 (late), 3 speeds, kick start, 24 clutch, new condition; £40.—Russell, 22, Queen St., Deal. [4501]

DOUGLAS, 1914, 2½ h.p., 2 speeds, new tyres, just overhauled; £36.—Poplars, The Ridgeway, Chingford, E.4. [4545]

1913-14 Douglas, T.T. Model, Indian red, fixed gear, very fast, nice machine, perfect; £30, or near offer.—Hclow.

1914 Douglas Model W, 2-speed, clutch, kick starter, lamp set, horn, tyres like new, perfect; £36/10.—C. Wallis, 94, Hewson Rd., Lincoln. [X1996]

2½ h.p. Douglas, 2-speed, perfect condition, all accessories, very fast.—Johnson, Old Cedar, Sydenham, London, S.E. [X1939]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800]

DOUGLAS, late 1914, delivered March, 1915, 2½ h.p., 2-speed, clutch, kick start, as new; £35.—Olerenshaw, Broadwell, Rugby. [4227]

1915 2½ h.p. 2-speed T.T. Douglas and accessories, in good condition; seen any time; £42.—Bounds' Garage, 223, High Rd., Kilburn. [4535]

DOUGLAS, late 1913, excellent condition, perfect running order, mechanical horn, lamps, generator; £29.—De Ville, Sherburn, Yorks. [4624]

DOUGLAS, 2½ h.p., 1916, W.D. Model, complete with electric lamp, speedometer, and horn; £43.—Moss, 11, Jackroyd, Newsome, Huddersfield. [X1716]

DOUGLAS, 1913, single-speed, T.T. late model, good condition, engine overhauled; £17.—Jennings, 41, Reed-Pond Walk, Gidea Park, Romford. [4764]

DOUGLAS 1914 Lady's Model, 2 speeds, free engine, kick starter, new condition throughout; £36.—Alfred Holland, Clarendon St., Coventry. [X2128]

DOUGLAS, 1915, 2 speeds, lamps, Lucas horn, tyres uncut, all black, specially fitted with Bosch mag.; £34 for quick sale.—Sanders, Bridge St., Hitchin. [4757]

4 h.p. Douglas, 1916, 3 speeds, free engine, lamps, generator, mechanical horn, hardly been used; 67 gas.; seen by appointment.—51, Claremont Rd., Forest Gate. [4691]

DOUGLAS, 1911, fitted with lamps and tools; £18; 1913 2-speed Bosch mag., Amac carburettor, £35; E.P. or exchange.—Service Co., 292, High Holborn, London. [4845]

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If you expect a reliable article, you must pay a reasonable price. We guarantee the following goods to be quite new, and are prepared to replace any tyre which proves faulty at a price proportionate to the mileage obtained, or, repair f.o.c. at our option.

All goods sent on seven days' approval against remittance.

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Please note, all goods must now be sent Carriage Paid; therefore, will Customers kindly include cost of carriage when sending remittance. Any excess will be refunded.

## COVERS.

KEMPSHALL:	Our Price.	List Price.
26×24 heavy anti-skid .....	21/-	32/-
26×24 heavy non-skid .....	30/-	45/-
26×24 heavy non-skid .....	39/6	52/6

## BATES:

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26×24 No. 1 special heavy ..	28/6	44/-
26×24 No. 1 special heavy ..	32/6	49/6

## MICHELIN:

26×24 heavy Trident .....	19/6	26/-
26×24 heavy Trident .....	21/6	30/-
26×24 heavy Trident, wired on ..	21/-	32/-
28×24 heavy Trident .....	23/6	29/6

(Will fit 28×3 rims.)

## MOSELEY:

700×80 Combination Oversize		
for 650×65 rim ..	55/-	75/-

## PEDLEY:

26×24 3-ribbed extra heavy ..	30/-	43/-
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## WOOD-MILNE:

26×24 Grip-ribbed heavy .....	20/-	33/6
26×24 Grip-ribbed extra heavy ..	23/6	46/-

## PIRELLI:

26×24 extra heavy ribbed .....	27/6	42/6
28×24 for Indian .....	27/6	48/-

## BEST ENGLISH MAKE:

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650×65 pillar rubber studded ..	22/6	50/-
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## CONTINENTAL:

650×65 heavy Fluted .....	25/-	34/-
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## GOODRICH:

700×80 for 650×65 rim, Safety Tread .....	37/6	43/6
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¾ in. section .....	1/1	1/9
1 in. section .....	1/3	2/-
Midland Patent Wire Goro.		
¾ in. section .....	1/1	2/-
1 in. section .....	1/3	2/2
Best English Make.		
¾ in. section (7 ft. lengths only)	1/-	1/5
1 in. section (6 ft. lengths) ..	1/3	1/11

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## MOTOR CYCLES FOR SALE.

## Douglas.

DOUGLAS, 1917, 4 h.p., and Mills-Fulford de Luxe sidecar, hood, screen, lamps, horn, as new, only ridden once.—Elco and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [0598]

1915 2½ h.p. Model U Douglas, 3-speed, footbaa, C.A.V. mag., upturned or semi-T.T. bars, Dunlops, good condition; £42/10.—Robinson's Garage, Green St., Cambridge. [4638]

DOUGLAS, 1913, T.T., 2-speed, thoroughly overhauled fortnight ago, spares and accessories, petrol; any trial; 30 gas., or offers.—Greenwood, 155, Seven Sisters Rd., Holloway, N.7. [4510]

1915 2½ h.p. 2-speed Douglas, mechanical horn, T.T. bars, lamp; price 40 gas.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealers in the South. Phone: 1024. [0912]

1916 2½ h.p. Douglas, W, 3-speed, clutch, kick start, Dunlops, Amac carburettor, C.A.V. mag., speedometer, excellent order; £47/10.—Robinson's Garage, Green St., Cambridge. [4661]

DOUGLAS, 2½ h.p., 2 speeds, kick, clutch, new Dunlops and belt, mechanical horn, latest Amac, very fast and powerful, climb anything, enamel and plating like new; sacrifice £30.—Seymour, 203, High St., Plumstead. [X1932]

DOUGLAS Motors.—Owing to National circumstances, it is impossible to supply private riders. We can supply 2½ h.p. only, if a permit is granted by the Ministry of Munitions, to doctors, farmers, and others.—Eli Clark, the Douglas agent, 223, Cheltenham Rd., Bristol. [X9692]

2½ h.p. Douglas, absolutely new; immediate delivery of Models U, V, W, clutch, against priority permits for doctors, farmers, war and munitions workers, etc. How and where to apply.—For full particulars write to the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [4662]

## Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012]

EDMUND, 1916, spring frame, Enfield 2 speeds, chain driven, M.A.O. 3 h.p. twin engine, in nice condition; £40.—Percy and Co., 337, Euston Rd., London. [4801]

## Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3 h.p. Twin; £57/10; and 2½ h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838]

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801]

ENFIELD 1914 6 h.p. Combination, splendid condition; price £60.—Ginger, Motors, Banbury. [X2049]

1916 6 h.p. Enfield Combination, new condition; any trial; £66, bargain.—29, St. Leonards St., Bow. [4712]

ENFIELD, 1917, 3 h.p.; 55 gas.; brand new.—Wilkins, Simpson, and Co., 11, Hammer-smith Rd., London. [4569]

ENFIELD 1917 6 h.p. Combination; 90 gas.; brand new.—Wilkins, Simpson, and Co., 11, Hammer-smith Rd., London. [4568]

1913 6 h.p. Enfield, cane sidecar, Binks carburettor; any trial or examination; £45.—W. Diggle, 135, Victoria Rd., Leeds. [4680]

ROYAL ENFIELD, 1916-17, 3 h.p., 2-speed, kick-starter, as new; £55/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [4829]

1916-17 6 h.p. Enfield Combination, fully equipped, mileage 800, absolutely as new; £90, or very near offer.—Webb, Rutter, Belmont, Surrey. [4651]

ENFIELD Motor Cycles, 2½ h.p. 2-stroke and 3 h.p. models in stock for immediate delivery.—P. J. Evans, 87-91, John Bright St., Birmingham. [X2067]

1913 6 h.p. Royal Enfield Combination, fitted with coachbuilt sidecar; the combination complete, fitted with all accessories, £40.—Wauchope's, 9, Shoe Lane, London. [4738]

ENFIELD, 1917, 2-stroke, £44/2. Brand new. We are Enfield specialists. Immediate delivery; all models in stock.—Wilkins, Simpson, and Co., 11, Hammer-smith Rd., London. [4570]

1915 3 h.p. Royal Enfield Twin-cyl. Motor Cycle, fitted with 2-speed gear and free engine, also fitted with handsome light coachbuilt sidecar and all accessories and tools; price £52/10.—Wauchope's, 9, Shoe Lane, London. [4731]

ENFIELD, 1916, 3 h.p. twin, and Canoelet sidecar, Lucas lamps, speedometer, horn, vapouriser fitted to run on paraffin; any trial given; will accept £45 for quick sale, no offers.—55, Southfield Rd., Ponders End, Middlesex. [4686]

ENFIELD.—We have actually in stock on the premises 1917 Enfield, electric model, only soiled, £105; 1917 standard model, S.H., with 2-seater sidecar, £96; 1916 standard model, £84; 1915 standard model, £75; 1914 standard model, £45; all 6 h.p., and with accessories; trials by arrangement; easy payments or ex-

changes; also best stock of best makes of petrol cycles.—Lumb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N. [4576]



## MOTOR CYCLES FOR SALE.

## Enfield.

6 h.p. Enfield Combination, 2 speeds, free, H.S., J.A.P. engine, Enfield sidecar, fully equipped, speedometer, etc., beautiful condition, guaranteed; 42 gns.; consider solo part.—35, Mowbray Rd., Brondesbury, N.W.6. [4674]

## Elswick.

ELSWICK-PRECISION, 4-stroke, 3½ h.p., 2-speed, 1914, excellent condition; £23.—Procter, G.P.O., Prescott. [X1934]

ELSWICK, 4½ h.p., 3-speed, sidecar, luggage carrier, wind screen, absolutely faultless, first-class appearance; £48.—Wainwright, Chemist, Eastleigh. [4505]

## Excelsior.

1916 7 h.p. American Excelsior and coach sporting torpedo sidecar; £69/10.—Motor Exchange, Horton St., Halifax. [4609]

AMERICAN Excelsior 7-9 h.p. Combination, late 1915, only done 3,000, with dynamo electric lighting equipment; £60.—Clarke, 4, Glenburnie Rd., Upper Tooting, S.W.17. [4528]

EXCELSIORS.—All models in stock; magneto model £75, electric lighting model £85; get a big X. You'll be satisfied.—Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester. [X1462]

AMERICAN Excelsior, standard model, 7 h.p., 3-speed, £75; de luxe model, with dynamo lighting equipment, £85; sidecars to match, £15 and £19. We are prepared to make a fair allowance for your present machine. Excelsior spare parts from stock.—The Premier Motor Co., Aston Rd., Birmingham. [4653]

## F.N.

1912 F.N., 5 h.p., clutch, Bosch waterproof, good order; £14.—R.H., 162, Heath Rd., Twickenham. [4646]

2½ h.p. F.N., 2 speeds, free engine, shaft drive, splendid condition; gift, 18 gns.—30, Talbot St., Bury. [X2086]

## Forward.

FORWARD, 1914, 2½ h.p., perfect; £20, bargain.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [4709]

## Grandex.

GRANDEX-PRECISION 1915 Model Coachbuilt Combination, 4½ h.p., mag., Enfield 2-speed countershaft gear, lamps, screen, beautiful condition; only 45 gns.; exchanges entertained.—Wandsworth Motor Exchange, Ebnor St., Wandsworth (Town Station). [4682]

## Harley-Davidson.

1916 Harley-Davidson Combination, in first-class condition; £82/10.—1, Berners Mews, Berners St., W.1. [4785]

1916 Harley-Davidson, perfectly new, what offers? also Gloria sidecar to match, £22.—Turpins, 29, Preston Rd., Brighton. [5623]

1915 Harley-Davidson, 7-9 h.p., 3-speed, in very good condition; £52.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0481]

HARLEY-DAVIDSON Combination, 1914, perfect order, lamps, speedometer, spares; £40, or offers.—Thornett, North Bar, Banbury. [X2021]

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802]

1915 Harley-Davidson and Sidecar, electric model, in first-class condition, looks like new; £64.—Arthur's, Westbourne Grove, London, W. [4503]

HARLEY-DAVIDSON, late 1915, magnificent turn-out, hood, screen, Lucas lamps and horn, speedometer; £80.—Austin, 709, Seven Sisters Corner, Tottenham. [4543]

HARLEY-DAVIDSON, late 1915, 20 gns. coachbuilt sidecar, perfect condition, spares; 69 gns., or near offer; see after 6.30.—B., 20, Oxford Gardens, Notting Hill, W. [4554]

BRAND New Model 11F 7-9 h.p. 3-speed Harley-Davidson, slightly shop-soiled; reduced to £75, first cheque secure.—The Premier Motor Co., Aston Rd., Birmingham. [4654]

HARLEY-DAVIDSON, 4-5 h.p., 2-speed, hand and foot clutch, disc wheels, tyres perfect, whole as new; any trial, expert examination; owner called up; nearest £48.—1, Costle St., Warwick. [X2059]

7-9 h.p. Harley-Davidson Combination, Canoelet sidecar, 1915, bought July, 1916, receipt above, lamps, and all accessories, perfect condition; £72/10, or close offer.—MacInn, 93, London Rd., Stoke-on-Trent. [X2017]

HARLEY-DAVIDSON 1917 17E Model and Swan sporting sidecar, actually in stock; also 1916 16F electric model and H.D. model B sidecar, £89/10; also 1915 plain model with sidecar, £65; easy payments and exchanges; also big stock of pedal cycles, best makes.—Lomb's, 151, High St., Walthamstow. [4578]

## Hazlewood.

4 h.p. Hazlewood-Jap (late 1915) Combination, torpedo car (new July, 1916), little used, unused last 9 months, owner active service, splendid condition, speedometer, accessories; £60.—Martinson, 8, Carlton Gardens, Herne Bay. [4522]

## Hobart.

HOBART, 1917, 2½ h.p., single-speed model; £34/13.—H. J. Marston, 50, Argyle St., Birkenhead. [X2119]

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MILLIONS ordered and in use by H.M. WAR OFFICE and our ALLIES.

Complete yet Compact.

A BOX OF STANLEY SPARES is a complete belt equipment outfit—the best and cheapest insurance you can effect against belt trouble on the road. It contains:



The STANLEY FASTENER, with the BEND that NEVER BREAKS, the BEST at any price. Hardened & tempered hook and flanged pins.



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The STANLEY SHIELD, which protects the belt fastener, prevents wear of the pulley, and conserves power. Specially designed for use with the Philippon Pulley. 8d.



STANLEY ADJUSTING HOOKS, for adjusting the length of your belt in one second. Set of 3 6d.

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Price 3/- post free. Send size of belt when ordering.

The LION FASTENER, guaranteed for 5,000 miles—6d.

Send P.C. for two interesting booklets.

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Write me for a copy.

IRVINE SMITH, Buttershaw, Bradford.

This Book will tell you all the special advantages of my Overalls. It's worth having.

## MOTOR CYCLES FOR SALE.

## Hobart.

HOBART, 1917, 2½ h.p., 2-speed, countershaft model; £40/19.—H. J. Marston, 50, Argyle St., Birkenhead. [X2118]

## Humber.

HUMBER, 3½ h.p., 2-speed; £23.—248, Bishopsgate, London, E.C. [4773]

1911 3½ h.p. Humber, 2-speed, wants overhauling; £9.—Missis, Cottesingham, Hull. [X2076]

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

1914 3½ h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863]

HUMBER, 1911, 3½ h.p., 2-speed; £18; E.P. or exchange.—Service Co., 292, High Holborn, London. [4846]

HUMBER, 3½ h.p., mag., spring forks, belt drive, Bosch mag.; £10/15.—Motor Exchange, Horton St., Halifax. [4610]

HUMBER, 3 h.p., Roc 2-speed, with wicker sidecar, recently overhauled; £22/10.—Scruse, 381, Battersea Park Rd., S.W. [4641]

HUMBER, 3½ h.p., 2 speeds, handle starter, in exceptional nice order and condition; £17.—Percy and Co., 337, Euston Rd., London. [4816]

HUMBER, late 1914, 3-speed, O.B. sidecar, hardly used, owner active service; condition perfect; £38.—16, Camden Rd., Wanstade, N.E.17. [4650]

HUMBER, 1914 (Sept.), 2½ h.p. twin, 3-speed, clutch, lamps, etc., 95 m.p.g., paraffin, good condition, not used 18 months; £21.—Levy, 21, The Hale, Tottenham, N. [4720]

HUMBER-J.A.P., 2½ h.p., Bosch mag., engine excellent, overhead valves, good sporting machine, suit a fast rider, very strong frame; £17.—B., 14, The Grangeway, Winchmore Hill, N. [X2008]

## Indian.

INDIAN, 1913, 7-9 h.p., 2 speeds, spring frame, coach-built sidecar, in good order; £28.

INDIAN, 1915, 7-9 h.p. T.T., in nice condition; £40.

INDIAN, 1915 5 h.p., 3 speeds, in nice condition; £45.—Percy and Co., 337, Euston Rd., London. [4803]

INDIAN, 4 h.p., 2 speeds, free engine; £22/10.—Motor Exchange, Horton St., Halifax. [4611]

INDIAN, 1916, 5 h.p., 3-speed, coachbuilt sidecar, 600 miles only; £70.—Ginger, Motors, Banbury. [X2048]

1916 Indian 5 h.p. Combination, in first-class condition; £57/10.—A. Plowman, 32, Station Rd., Finchley, N.3. [4495]

INDIAN Combination, 1913, 7 h.p., 2-speed, clutch, spring frame; £32.—Write Skinner, 9, Lansdowne Rd., Dalston, N.E. [X2006]

1916 Powerplus 7-9 h.p. Indian Combination, in first-class condition; £70.—Ingle, Rose Villa, Great-ham, Stockton-on-Tees. [X1734]

INDIAN, 1915, clutch model, and coach sidecar, condition like new; £55.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [4705]

INDIAN 1916 Combination, 7-9 h.p., 2-speed, twin-cyl., torpedo sidecar, little used, sound condition; price £85.—Deards, Ash Villa, Harlow, Essex. [4628]

5-6 h.p. Indian, unused since 1914, new Lucas lamp set and spare new tyre, cost £5; just overhauled, cost £7; little used, dropped frame; £25.—80, Bishop Rd., Southport. [X1671]

INDIAN, 1914, 3-speed, kick starter, semi T.T. bars; £45; Indian, 1916, 3-speed, clutch, fine Britanic sidecar, £68/15; E.P. or exchange.—Service Co., 292, High Holborn, London. [4832]

INDIAN 1916 Model C, 7-9 h.p., 3-speed, clutch, kick starter, electric lamps and horn, Millford de Luxe sidecar, with hood, screen, and luggage carrier; £77.—Rev. Collins, Kelvedon, Greenhithe. [4599]

INDIAN, 1915 spring frame model, 7-9 h.p., electric lighting, with Millford Empress sidecar, £68/10; also big stock of pedal cycles, best makes.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [4577]

## Ivy.

IVY, 2-stroke, 2½ h.p., 1915, good tyres, fully equipped, as new throughout; £25.—Advertiser, 156, 6th Portland St., W.1. [3924]

## Ixion.

IXION, single-speed, Villiers 2-stroke engine, tyres good, enamelling and plating good; £30; E.P. or exchange.—Service Co., 292, High Holborn, London. [4828]

IXION, 2½ h.p., 2-stroke, 1915, E.I.C. mag., accessories, good tyres, little used, splendid condition, powerful climber; any demonstration; 18 gns.—34, Forest Hill Rd., Honor Oak, S.E.22. [4743]

## James.

1912 3½ h.p. 2-speed Free Engine James and sidecar; £25.—Motor Exchange, Horton St., Halifax. [4612]

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803]

JAMES.—We can give immediate delivery from stock of the 1917 3½ h.p. 3-speed James—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0492]



## MOTOR CYCLES FOR SALE.

James.

**31** h.p. Twin James, countershaft 3-speed, purchased 1915, as new, ridden 120 miles only; cost 60 gns., absolute bargain at £50.—Parker and Son, St. Ives, Hunts. [4751]

**JAMES** 1914 4½ h.p. Combination, countershaft 3-speed, speedometer, wind screen, luggage carrier, Lucas, etc., just been overhauled by makers; £44.—Off Licence, Trumans Rd., Stoke Newington. [4594]

**BEST** Bargain ever offered.—4½ h.p. James combination, new July, 1916, and used very little, many spares and extras; cost over £90; guaranteed order; take 3 up any hill, spares, etc.; any trial; £55, rock bottom.—Webb, Jeweller, Chesterfield. [X2058]

**JAMES**, electrical model, 1916, 4½ h.p., complete with sidcar, a most excellent combination, fitted with Lucas dynamo lighting set, including 3 lamps, electric horn, tyres good, condition fine, £95; James combination, 1915, 4½ h.p., all chain drive, with James coachbuilt sidcar, 3-speed, kick-starter, Bosch mag., extra heavy Dunlop all round, the whole outfit in splendid condition, £65; E.P. or exchanges.—Service Co., 292, High Holborn, London. [4834]

J.H.

**J.H.**, 2-speed, new; 54 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [4839]

**J.H.**, 2-stroke, 1917, 2-speed countershaft gear box, all latest improvements; price £45.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [4706]

Juno.

**JUNO-VILLIERS**, 1916, 2½ h.p., 2-stroke; £25.—248, Bishopsgate, London, E.C. [4771]

**JUNO-VILLIERS**, 1916, 2½ h.p., 2-stroke, 2-speed; £30, or gradual payments.—248, Bishopsgate, London, E.C. [4770]

Lea-Francis.

**LEA-FRANCIS**, 1915, 3-speed, kick-starter, clutch, Lucas lamp and horn, spare chain, as new; 50 gns.—Gibb, Worcester St., Gloucester. [4748]

Levis.

**LEVIS** Popular Model; a bargain, £15.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [4574]

**BABY** Levis, 2½ h.p., very little used, in excellent order; £25.—F.P.R., Woodthorpe, Cobham, Surrey. [X2019]

**1915** Sporting Levis, perfect; £20, or near offer.—Write, Archer, 21, Eastlake Rd., Camberwell, S.E.5. [X1986]

**COLMORE** Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804]

**LEVIS**, late 1915, Popular, only ridden 500 miles, perfect condition; £22.—Daumant, Highfield Rd., Hertford. [X2003]

**LEVIS** 1917 Popular, latest model, brand new; £32.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [4573]

**LEVIS**, 1915, 2½ h.p. Popular Model, overhauled, all new bearings, accessories; £20.—35, Bramblebury Rd., Plumstead. [4530]

**LEVIS** Popular, 2½ h.p., good condition, done 2,000 miles, lamp, horn, cyclometer, spare tube; £23.—Elliott, Derrys Wood, Womersley, Guildford. [4513]

**CALL**ED UP; 25 gns.—2½ h.p. Levis, nearly new, horn, tools, lamps, all complete, guaranteed everything sound.—Miller, 62, Hampstead Rd., N.W. [3993]

**LEVIS**, just been overhauled by makers, re-enamelled, and plated, T.T. lamps, horn, variable Bosch, Amac, tyres A1; £20, a gift.—5, Stockwell Rd., S.W.9. [4644]

**LEVIS**, 2½ h.p., 2-stroke, good mechanical condition, tyres fair, very handy lightweight, ready for riding; bargain, £15.—Advertiser, 156, Gt. Portland St., W. [4790]

**LEVIS**—We can give immediate delivery from stock of the 1917 Levis Popular Model, price £32.—Elice and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0551]

Martin.

**MARTIN-J.A.P.**, 4½ h.p., speed 78 miles hour; £30, offers.—Bell, 49, High St., Kingston-on-Thames. [4699]

Matchless.

**MATCHLESS** Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881]

**1913** Matchless, T.T., 8 h.p., 6-speed, in splendid condition; £35.—Elice and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0597]

**MATCHLESS** 8 h.p. T.T., twin J.A.P. engine, Vintee 2 speeds, twin belt drive, in real good order; £25.—Percy and Co., 537, Euston Rd., London. [4835]

**LATE** Matchless Combination, 8B, M.A.C., hood and screen, lamps, speedometer, exceptionally good order; £72.—J. Canty, Crockley Hill, Swanley, Kent. [4742]

**MATCHLESS** Combination, 8-12 h.p. J.A.P., 2-speed, lately overhauled; absolute bargain, £60; owner joining up; seen by appointment.—81, High Rd., South Tottenham. [4715]

**MATCHLESS** Combination, new, 8B2 M. Model, detachable wheels, 3-speed, J.A.P. engine, Palmer cord, light car tyres, enamelled service gear, £120.—1a, Bloomfield Rd., Plumstead, S.E.18. [4502]

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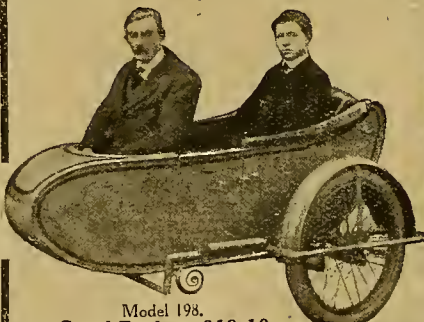
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Matchless.

**MATCHLESS-J.A.P.**, 9 h.p., 7 speeds, special racing model, mileage under 5,000, perfect condition, engineer owner, complete with Lucas lamps and horn, speedometer, tool kit; price £55.—Hughes, Coventry, Box 1,025, c/o The Motor Cycle. [X2016]

**MATCHLESS**—Delivery in about 10 days of the new 6 h.p. War Model Matchless, J.A.P. engine, 3 speeds, Matchless coachbuilt sidcar, extra heavy tyres, detachable wheels and spare; £120; exchanges arranged; first come, first served.—Maudes' Motor Mart, 100, Gt. Portland St., London, W.1. Tel.: 552 Mayfair. [4820]

Minerva.

**31** h.p. Minerva (less unit), very low; 55/—Brookes, 90, Burton Rd., Lincoln. [X2052]

**41** h.p. Twin Minerva, recently overhauled, and in good condition, Simms mag., B. and B. carburettor; £55.—P., 20, Manor Rd., Yeovil. [4499]

Motosacoche.

**1914** 2 h.p. Motosacoche, variable gear, nice order; £12/10.—53, Brownhill Rd., Catford. [4635]

**MOTOSACOCHE** Lightweight, 2½ h.p., jockey pulley, Whittle belt, in very nice condition; £8.—Elice and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0480]

**MOTOSACOCHE, Ltd.**, of Kenmont Works, College Park, Willesden Junction, N.W.10, have a limited number of 3½ h.p. machines, 500 c.c., twin cyls., air-cooled exhaust valves, chain drive, footboards, etc., £65 each net; also one 2½ h.p. machine, same specification except air-cooled exhaust valves, £50; also a limited number of 6 h.p. machines, with M.A.G. overhead inlet valved engines, and small car tyres, otherwise similar specification, £77 net. These machines are complete, tested, and ready for delivery. [4600]

New Hudson.

**1915** 2½ h.p. New Hudson, 2-stroke, 2-speed; £23.—356, Lordship Lane, E. Dulwich. [4602]

**1915** 3½-4 h.p. New Hudson Combination, 3-speed countershaft; £46.—Betts, 56, Lincoln Rd., Peterborough. [4509]

**NEW** Hudson, 4b.p., 3-speed, 1914 model; £30, or nearest offer.—H. J. Marston, 50, Argyle St., Birkenhead. [X2121]

**NEW** Hudson, 6 h.p., 1914, 3-speed, combination; £65.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [4707]

**NEW** Hudson Big Six Combination, 1915, new engine just fitted by makers; £60, or exchange for small car.—Ferris, Greenstreet, Sittingbourne. [4514]

**31** h.p. New Hudson (J.A.P.), 3-speed, clutch, good 2nd condition; £25, or exchange with £25 for good coach combination.—J. Pugh, Havod-Triscold Farm, Argood, Mon. [4631]

**NEW** Hudson, 1916, 4 h.p., countershaft clutch, 3-speed, War Office Model, P. and H. lamp set, Lucas horn, Stewart warning signal, and sporting art cane torpedo sidcar, in splendid condition; £54, or £30 for cycle alone; no offers or dealers.—Aigburth, Colchester Villas, Stanley Rd., Croydon. [4520]

New Imperial.

**NEW** Imperial, 1917, 2½ h.p., 3½ h.p., 6 h.p. models, in stock.—Crow Bros., Guildford. [2563]

**COLMORE** Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805]

**NEW** Imperial-Jap, 2½ h.p., 1916; £35; E.P. or exchange.—Service Co., 292, High Holborn, London. [4849]

**21** h.p. New Imperial, 1915, 2 speeds, etc., splendid condition; 22 gns.—30, Talbot St., Burnley. [X2087]

**NEW** Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0839]

**NEW** Imperial, 2-speed, 39 gns., 2-speed, clutch, and kick-starter, 46 gns.; new; E.P. or exchange.—Service Co., 292, High Holborn, London. [4840]

**NEW** Imperials, 2 speeds, clutch, and kick starter, and ladies' models, in stock for immediate delivery.—P. J. Evans, 87-91, John Bright St., Birmingham. [X2068]

**NEW** Imperial-Jap.—We can give immediate delivery from stock of the 1917 2½ h.p. 2-speed new Imperial-Jap.—Elice and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0552]

**NEW** Imperials, 1917 models, for immediate delivery, No. 1 39 gns., No. 2 46 gns.; two new 1916 models No. 1 at £38.—Colmore Depots, 211, Deansgate, and 31, Renshaw St., Liverpool. [0886]

Norton.

**NORTON**, 1915, T.T. Model, fast machine, complete with accessories; £42/10.—Wauchope's, 9, Shoe Lane, London. [4732]

**1915** 3½ h.p. Norton, BS Model, Sturmey-Archer 3-speed hub gear, handle-bar control, Binks carburettor, lamp, mechanical horn, speedometer; £42/10.—Robinson's Garage, Green St., Cambridge. [4663]

**1916** 4 h.p. Norton Combination, 3-speed, clutch, kick-starter, T.T. bars, lamps, horn, speedometer, with or without disc, run 1,000 miles, indistinguishable from new; 70 gns., or part exchange 2½ h.p. Douglas.—16, Broad St., Ross, Herefordshire. [X2138]



## MOTOR CYCLES FOR SALE.

## N.S.U.

32 1 1/4 h.p. 2-speed N.S.U., h.b.c. carburetter; £12/10.-  
Motor Exchange, Horton St., Halifax. [4613]  
£5.-N.S.U. 3 1/2 h.p., speed gear, L.T. mag., new B.B.,  
good tyres, etc.—Particulars, Goodall, St. John's  
Terrace, Kingston Vale, Putney. [4649]

## O.K.

O K. Juniors.—Call and inspect at the N.W. district  
agent, F. J. Youngs, 2-3, The Parade, Kilburn. [0910]  
O K. Junior, 2-speed, new; 42 gns.; E.P. or ex-  
change.—Service Co., 292, High Holborn, London. [4841]

## P. and M.

P. and M. and Sidecar, 1913 engine, 2 speeds; bar-  
gain, £23.—H. V. Locke, Draper, Penge. [4718]  
3 1/2 h.p. P. and M. and 2-seater sidecar, fine lot; £28.-  
Deno, 36, Highbury New Park, N. [X1570]  
P. and M., 3 1/2 h.p., 2-speed, and Montgomery sidecar,  
all in good condition, runs on paraffin; trial run  
given; £30.—302, York Rd., Wandsworth, S.W.18. [4524]

## Portland.

7-9 h.p. Portland C.B. Combination, 2-speed, tyres per-  
fect, 60 m.p.g., powerful, and genuine bargain; any  
trial; £35; after 6 evenings.—19, Wilcox Rd., South  
Lambeth, London, S.W.8. [4629]

## Precision.

3 1/2 h.p. Precision, single-cyl., T.T. model, Bosch mag.,  
34 B. and B. carburetter, Druid forks, good condi-  
tion; £15.—The Premier Motor Co., Aston Rd., Bir-  
mingham. [4855]

## Premier.

PREMIER, 3 1/2 h.p., 1913, 3 speeds, kick starter, foot-  
boards; £28.—Eagles and Co., High St., Acton, W.3. [X2036]

19 14 2 1/2 h.p. Premier, single-speed, excellent condition  
accessories; £17.—34, Highdown Rd., Hove,  
Sussex. [4531]

19 14 3 1/2 h.p. Premier, 2 speeds, coachbuilt sidecar.  
£45; cash or easy terms.—R. E. Jones (Girages),  
Ltd., Swansea. [0823]

PREMIER, 1912, 3 1/2 h.p., 2 speeds, wicker sidecar,  
adjustments required; £19/19.—Motor Exchange,  
Horton St., Halifax. [4614]

PREMIER, 1914, 3 1/2 h.p., 2 speeds, countershaft, per-  
fect condition, Lucas lamp, horn, tools; cost £53,  
bargain, £27 cash.—47, Vicarage Rd., Camberwell, S.E.5.  
[4541]

19 14 3 1/2 h.p. Premier Combination, 3-speed, counter-  
shaft, kick start, just overhauled at works, guar-  
anteed perfect condition; £38, lowest.—Lester, 274, Ken-  
nington Park Rd., S.W. [4499]

THIS Week's Bargain.—Late 1915 Premier, 3 1/2 h.p., 2-  
speeds, kick start, nearly new tyres, belt, lamps,  
etc., only done 200 miles; first £38 received secure.—  
Btown, Gloucester Rd., Chesterfield. [X2079]

PREMIER and Comfortable Wicker Sidecar, Grado  
multi pulley, £30; Premier and sidecar, 1916,  
spare tank, tyres good, £75; E.P. or exchange.—Ser-  
vice Co., 292, High Holborn, London. [4826]

19 14 Premier Combination, 3 1/2 h.p., countershaft 3-  
speed, clutch, kick starter, coachbuilt sidecar,  
wind screen, luggage carrier, lamps, speedometer; trial  
by arrangement; bargain, £45.—K., 34, Alexandra Rd.,  
S. Woodford, Essex. [X2047]

PREMIER, 1914, 2 1/2 h.p., Armstrong's Tourist  
Trophy 3-speed gear, 100 m.p.g., electric equip-  
ment, speedometer, horn, tools, spares, not been used  
for 12 months, condition as new; sacrifice for £28, or  
near offer; seen after 4.—Harvey, Private House,  
Union Brewery, Wandsworth. [4774]

## Quadrant.

4 1/2 h.p. Quadrant, C.B. combination, new condition,  
£4 and £25 cash, for good twin combination, or  
sell £38.—Edwards, 37, Hamilton Rd., Walthamstow,  
E.17. [4777]

QUADRANT 1914 8-9 h.p. Combination, engine just  
rebushed, big end, little ends, crankcase, new  
gudgeons, Binks, overhead valves, Enfield 2-speed, all-  
chain push drive, new 700x80 Dunlop on back, other  
tyres good, handsome 2-seater tandem sidecar, hood,  
wind screen, and side curtains, lamps, Lucas horn, spare  
valves—tube, and tyre, take four anywhere, a handsome  
lot; £60; photos on application.—Wm. Atkinson, Photo-  
grapher, Houghton-le-Spring, Durham. [X1935]

## Radco.

RADCO, 2-stroke, 1915, will guarantee.—5, Bonheur  
Rd., Bedford Park, W. Phone: 948 Chiswick. [4583]

## Rex.

REX Motor Cycle and Sidecar; £42; E.P. or ex-  
change.—Service Co., 292, High Holborn, London. [4831]

REX, 3 1/2 h.p. Tourist, waterproof Bosch mag., h.b.c.  
carburetter; £29/15.—Motor Exchange, Horton St.,  
Halifax. [4615]

REX 1912 Combination, 6 h.p. twin free engine,  
m.v., Comly coachbuilt sidecar; £19/10.—34,  
Lea Hall Rd., Church Rd., Leyton. [4713]

REX Sidette, genuine 1913, 6 h.p. twin, gears, clutch,  
handle starting, good tyres, guarantee, reliable  
combination; £28/10.—R. S. and G., 136, Gt. Dover  
St., S.E.1. [4681]

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2 1/2 and 3 h.p. Enfield pattern .....	3/6	"
3 1/2 h.p. Ariel pattern .....	4/-	"
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1913 INDIAN, Spring frame .....	£40	0
1913 HUMBER, 3-speed, 2 1/2 h.p. ....	£25	0
1913 A.J.S., 2 1/2 h.p., 2-speed, clutch, kick-starter .....	£29	0
1912 HUMBER, 2-speed .....	£24	0
1912 RUDGE and wicker Sidecar .....	£22	0
1912 ENFIELD, 2 1/2 h.p., 2-speed .....	£22	0
1911 P. & M. Combination .....	£28	0
1911 HUMBER, 2-speed .....	£18	0
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## MOTOR CYCLES FOR SALE.

## Rex.

LATE 1914 Rex, double cyl., 6 h.p., and coach sidecar,  
all in splendid condition; sale or exchange handle  
starter for kick starter.—J. Taylor, Bank St., Souer-  
cotes, Alfreton, Derbyshire. [X1953]

REX 1914 Cin., 6 h.p., countershaft 3 speeds, chain  
drive, kick starter, enclosed valve, W.O. Model.  
wants overhauling; quick sale £35.—Woolf, 15, Brush-  
field St., Bishopsgate. After 6 p.m. [4497]

## Roc.

ROC, late model, with Bramble coachbuilt sidecar,  
5-6 h.p. twin, mag., F.E.; any trial; only  
£26/10; exchanges entertained.—Wandsworth Motor  
Exchange, Ebner St., Wandsworth (Town Station). [4683]

## Rover.

ROVER, 3 1/2 h.p. T.T., free engine, brand new, in stock.

ROVER, 3 1/2 h.p., 1913, 3 speeds, in exceptional nice  
order; £27.—Percy and Co., 337, Euston Rd., Lon-  
don. [4819a]

COLMORE Depots, Birmingham and Manchester, for  
quickest delivery of Rover motor cycles. [0883]

1914 3 1/2 h.p., 3-speed Rover, lamp, excellent condition;  
£40.—Parker and Son, St. Ives, Hunts. [4750]

1912 Rover, in good running order; £20; seen any  
time.—Bouds' Garage, 223, High Rd., Kilburn. [4536]

ROVER, 1917, 3 1/2 h.p., countershaft model; £74/10.  
—H. J. Marston, 50, Argyle St., Birkenhead. [X2117]

3 1/2 h.p. 1914 Rover, 3-speed model, very fast and  
22 powerful; £27/10.—Wauchope's, 9, Shoe Lane,  
London. [4733]

ROVER, 3 1/2 h.p., 2-speed, plate clutch, and sidecar,  
new coach body; £29/10.—Motor Exchange, Horton  
St., Halifax. [4616]

ROVER Combination, 1913, 3 1/2 h.p., lamps, horn;  
£25.—Elce and Co., 15-16, Bishopsgate Av., Camo-  
mille St., E.C. [0479]

ROVER Combination, 1913-14, 3 speeds and clutch,  
fully equipped; £35.—Stott, Abbotsfield, Flixton  
Rd., Urnston, Manchester. [X1800]

ROVER Motor Cycles, 1917 models from stock;  
£74/10; two only; first cheque secure.—Colmore  
Depot, 211, Deansgate, Manchester. [0887]

3 1/2 h.p. Rover, 1914, 3 speeds, clutch, starter, fully  
22 equipped, in splendid condition; £34, or ex-  
change.—Needham, 212, Vallance Rd., Bethnal Green.  
[4693]

1913 1/2 Rover, 2-speed gear, in good condition; sell  
£30, or exchange for Indian combination and  
cash.—Prior, Paddington Manor, Abinger Hammer, near  
Dorking. [X2114]

ROVER Motor Cycles; all models in stock for im-  
mediate delivery; 3 1/2 h.p. T.T., 3-speed countershaft  
and Philipson pulley.—P. J. Evans, 87-91, John Bright  
St., Birmingham. [X2069]

ROVER 1914 4 1/2 h.p. Coach Combination, 3-speed,  
free engine, clutch, speedometer, all in perfect  
order and fully equipped; £35.—Grose, Prudential,  
Tregony, Grampond, Cornwall. [4696]

ROVER, new, 3 1/2 h.p., T.T., Philipson pulley, ridden  
twice; cost £55, sacrifice, £48; would take good  
combination, cash either way.—'Phone: Park 88,  
Box L3,972, c/o The Motor Cycle. [4787]

ROVER 1914 Combination, 3-speed, splendid condi-  
tion, fitted electric light and acetylene, spare belt,  
new tyres, £45; also Paragon folding sidecar, cane  
body, perfect, exceptional bargain, £4.—3, Norbury Pa-  
rade, S.W. [4493]

ROVER 1914 3 1/2 h.p. Combination, 3 speeds, clutch,  
H. Millford sidecar, Senspray, complete lamps, etc.,  
semi T.T. lamp, splendid condition, photos; £40; sale  
£35; exchange 4 h.p. Douglas, cash either way; ride  
50 miles.—Sutton, Little Clacton, Essex. [X2115]

## Rudge.

RUDGE, I.O.M., special, fast mount, almost new;  
£50.

RUDGE Multi, 3 1/2 h.p., 1916, equal to new, speed-  
ometer, Lucas lamps; £46.

RUDGE, 2 speeds, 3 1/2 h.p., in good condition; £23.—  
Percy and Co., 337, Euston Rd., London. [4807]

RUDGE Multi, semi T.T. bars, wide tank, fast ma-  
chine; £35.—Wauchope's, 9, Shoe Lane, London.  
[4734]

1914 3 1/2 h.p. Rudge Multi, perfect condition, tyres  
as new; 28 gns.—13, King Sq., Goswell Rd.,  
E.C.1. [4719]

I.O.M. Rudge, 3 1/2 h.p., as new, lamp, horn, and  
speedometer; £50.—H. J. Marston, 50, Argyle St.,  
Birkenhead. [X2120]

RUDGE Multi, 3 1/2 h.p., 1913, very fast, new appear-  
ance, accessories; £28/10.—Eagles and Co., High  
St., Acton, W.3. [X2037]

RUDGE 3 1/2 h.p. Coachbuilt Sidecar Combination, 2  
speeds, fine condition; £34.—Eagles and Co., High  
St., Acton, W.3. [X2038]

1916 Rudge Multi Combination, 5-6 h.p., h.b.c.,  
Miller lamp set; £68; perfect.—Box 1,032, c/o  
The Motor Cycle. [X2141]



## MOTOR CYCLES FOR SALE.

## Rudge.

**RUDGE** Multi, 3½ h.p., multi gear, and cane sidecar; price £45.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [4708]

**1915** I. of Man Rudge, T.T. bars, in excellent condition throughout; £48.—Elce and Co., 15-16, Bishopsgate Av., Cannonville St., E.C. [0491]

**RUDGE** Multi, 3½ h.p., Millford coachbuilt sidecar, all perfect, new Dunlop belt and tyres, one heavy, 2 extra heavy; £45.—Weekes, 44, Southover St., Brighton. [4544]

**RUDGE** Multi, 3½ h.p., 1915, and Canoelet sidecar, 3 perfect, 3 lamps, spare belts, numerous accessories; £45, or nearest offer.—Long, Broad St., Staple Hill, Bristol. [X1863]

**32** h.p. Rudge Multi, all new last year, having been rebuilt by mokers nearest to £32, 14 gallons petrol with it; genuine bargain.—Box 1,012, c/o The Motor Cycle. [X1865]

**RUDGE**, 1913, T.T. engine and bars, Philipson pulley, new lamp set, Stewart warning signal, 2 belts, hardly used last 18 months; £26/10, or offer.—Archer, 25, Burrage Grove, Plumstead, London, S.E. [4534]

**32** h.p. Rudge and Light Coachbuilt Sidecar, good tyres, and perfect mechanical condition, lamps, and spare belt; trial run given; will accept £27/10 for quick sale.—58, Malvern Rd., Dalston, N.E. [4689]

**CAREFULLY** Used 3½ h.p. Rudge Multi, 1914, Sen-spray, new tyres, Mills-Fulford sidecar, practically new, full screen, hood, curtains, lamps, extremely beautiful condition; 57 gns., bargain.—5, Stonor Rd., West Kensington. [X2083]

**RUDGE** Multi, fitted for substitute, excellent condition, £36/15; Rudge with N.S.U. gear, £32/10; Rudge Multi, in excellent condition, £36/15; Rudge, I.O.M. engine, fitted with large head lamp, and Klaxon mechanical horns knee grips, full T.T. bars, £45; E.P. or exchange.—Service Co., 292, High Holborn, London. [4847]

## Royal Ruby.

**ROYAL** Ruby, 2-stroke, £29/10; 3½ h.p., 3-speed, Model E, £72; new; E.P. or exchange.—Service Co., 292, High Holborn, London. [4843]

## Scott.

**COLMORE** Depots, Birmingham, and Manchester, for Scott motor cycles. [0806]

**SCOTT** and Canoelet Sidecar; £30.—248, Bishopsgate, London, E.C. [4772]

**SCOTT**, £20, fast machine, pull sidecar.—Wanchope's, 9, Shoe Lane, London. [4727]

**SCOTT**, 1913, in excellent condition, Bosch mag.; £38/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [4848]

**SCOTT**, 1916, practically new, guaranteed perfect in every way; accept £55; fitted with semi T.T. bars.—Embro Motor Co., Charlotte St., Hull. [4794]

**SCOTT** Motor Cycle and wicker sidecar, in perfect running order; owner with colours; price £45, absolute bargain.—27, Southchurch Rd., Southend-on-Sea. [4512]

## Singer.

**42** h.p. Singer, 2-speed model, and sidecar, 1914 combination, complete with tools and accessories; £45, guaranteed.—Wanchope's, 9, Shoe Lane, London. [4729]

**1914** Singer, countershaft 2-speed, with strong Mills-Fulford sidecar; bargain; £34; completely equipped.—Newham, 223, Hammersmith Rd., W.6. Phone: 80. [4670]

## Sparkbrook.

**SPARKBROOK**, 1917, 2-stroke, unscratched, 2-speed; £39; E.P. or exchange.—Service Co., 292, High Holborn, London. [4850]

## Sun.

**COLMORE** Depots, Birmingham and Manchester, for delivery from stock of all models of Sun motor cycles. [0807]

**SUN-VILLIERS**, 2-speed, £36; Sun-Jap, 4 h.p., £63; new; E.P. or exchange.—Service Co., 292, High Holborn, London. [4842]

**SUN-V.T.S.**, 2½ h.p., late 1916, as new, run about 500 miles, complete with accessories; £26.—13, Richmond Rd., Ipswich. [4688]

## Sunbeam.

**1915-16** 3½ h.p. Sunbeam Combination, as new, fully equipped, sell separately, absolutely perfect; £67.—59, Station Rd., Landaff North. [X2074]

**1915** 3½ h.p. 3-speed Sunbeam Combination, fully equipped, excellent condition; £80: cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0862]

**6** h.p. Sunbeam (Oct., 1914), and coach-built sidecar, splendid condition; £70; Douglas lightweight part.—P. Hemingway, Redvers House, Stanley, Wakefield. [X2072]

**1915** 6 h.p. Sunbeam Combination, Gloria de Luxe 5 gns. sidecar, fully equipped, done 5,000, all as new; cost £150, quick sale £75; after 6 p.m.—24, Tudor Gardens, Barnes. [4791]

**1916** 3½ h.p. Sunbeam, black-gold, 3-speed, hand-controller, clutch, semi-T.T. bars, complete with lamp, about 1,000 miles only; £76.—Robinson's Garage, Green St., Cambridge. [4660]

## INCREASED PREMISES.

Owing to the large increase in our Business, we have been compelled to open large new Show-rooms and Garage at **31, High Street, Hampstead**, in addition to our present premises. We have now every facility for continuing to accept Machines and Light Cars for Sale on Commission, at 5% inclusive—no sale, no charge—and are increasing our business in all directions. Customers will find a still better selection of Cars and Motor Cycles, of which the following are a selection from the 150 in stock:

<b>ENFIELD</b> 1916 Combination, mileage under 1,000, as new	82 gns.
<b>ENFIELD</b> , 1915, 3 h.p., 2-speed	32 gns.
<b>ENFIELD</b> , 1916, 2-speed, 2-stroke	29 gns.
<b>ENFIELD</b> , 1913, 2-speed, clutch, 2½ h.p.	24 gns.
<b>RUDGE-MULTI</b> , 1913, wide tank	26 gns.
<b>RUDGE</b> , T.T. Philipson, 1913	22 gns.
<b>ZENITH-GRADUA</b> , 1915, 4 h.p., twin, countershaft, red finish	39 gns.
<b>B.S.A.</b> , 1913, T.T. 2-speed, clutch	29 gns.
<b>CALTHORPE-J.A.P.</b> , 1915, 2-sp., clutch	19 gns.
<b>DOUGLAS</b> , 1913, T.T. 2-speed	29 gns.
<b>DOUGLAS</b> , 1914, T.T. 2-speed	32 gns.
<b>DOUGLAS</b> , 1915, T.T. 3-speed	37 gns.
<b>GRANDEX-PRECISION</b> , 1917, T.T. 4 h.p., brand new	29 gns.
<b>HARLEY-DAVIDSON</b> , 1915, Combination	65 gns.
<b>HARLEY-DAVIDSON</b> , 1916, Combination	79 gns.
<b>NORTON</b> , 1914, T.T. Philipson	33 gns.
<b>NORTON</b> , 1915, T.T. Philipson	37 gns.
<b>PREMIER</b> , 1914, 3½ h.p., 3-sp., clutch, kick-start, Canoelet Sidecar	39 gns.

## CARS.

<b>MORRIS-OXFORD</b> , 1913, re-painted, overhauled	109 gns.
<b>BELSIZE</b> , 1913, 10-12 h.p., light 4-seater	169 gns.
<b>CARDEN MONOCAR</b> , 1915, 4½ h.p., twin J.A.P.	42 gns.
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## EXCHANGES.

**RIDER TROWARD & Co.,**  
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The only Harley-Davidson Agent  
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## NEW MACHINE.

The last 17 **HARLEY** Outfit £126 10

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1914 **Racer**, very fast..... £55 0  
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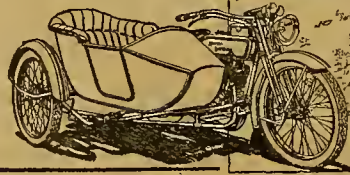
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37, TURNHAM GREEN  
TERRACE

(near Turnham Green  
Station).

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## MOTOR CYCLES FOR SALE.

## Swift.

**SWIFT**, 3-speed, Sydenham sidecar. T.T. bars, a very sporty combination; £47/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [4833]

## Torpedo.

**TORPEDO-PRECISION**, 2½ h.p., 2-speed lightweight spring forks, wants slight attention; £11.—Motor Exchange, Horton St., Halifax. [4611]

## Triumph.

**TRIUMPH**, 3½ h.p., N.S.U. 2 speeds, in real good order; £15.

**TRIUMPH**, 3½ h.p., in good order, with sidecar; £15

**TRIUMPH**, 3½ h.p., 1914, 3 speeds, in good order; £32.—Percy and Co., 337, Euston Rd., London. [4811]

**1912** 3½ h.p. Triumph, in perfect condition, lamp set horn, tools, etc.; £23.—Below.

**1908-9** Triumph, 3½ h.p., perfect condition, recently renovated at work, lamps, horn, etc.—Apply Latto, 11, Gallosan Rd., Plumstead, S.E.18. [X1933]

**1913** 3½ h.p. Triumph, free engine, clutch model; £19.—556, Lordship Lane, E. Dulwich. [4603]

**TRIUMPH**, 1912, F.E., in good condition; £25.—F. Keene, 2, Cornford Grove, Balham. [4522]

**1910** 3½ h.p. T.T. Triumph, good order; bargain; £12/10.—53, Brownhill Rd., Catford. [4633]

**1912** Triumph, 2-speed, coach sidecar, perfect; £27.—88, Reservoir Rd., Edgbaston, Birmingham. [X2136]

**1913** Triumph and Sidecar, 3-speed model, nice, smart turnout; £35.—Wanchope's, 9, Shoe Lane, London. [4721]

**TRIUMPH**, 3½ h.p., 1911, in splendid condition; 1 tyre, new; £25.—H. J. Marston, 50, Argyle St., Birkenhead. [X2122]

**1908** Triumph, just overhauled, new Dunlop back Multi gear; £19.—4, Station Parade, Gerrard Cross, Bucks. [4621]

**TRIUMPH**, 1914, 4 h.p., Speedwell coachbuilt sidecar complete with spares; £48.—69, Peckham Rd., London, S.E. [X2044]

**TRIUMPH**, 1911, clutch model, accessories, splendid running order; £20.—81, Amersham Vale, New Cross, London. [4544]

**TRIUMPH**, 1911, 3½ h.p., 2-speed, free engine, new tyres, splendid condition; £22/10.—Box L3,964, c/o The Motor Cycle. [4556]

**32** h.p. Triumph, 3-speed, clutch, pedal start, reliable machine; accept £22.—Newham, 223, Hammer-smith Rd., W.6. Phone: 80. [4677]

**TRIUMPH**, 1913, 3½ h.p., new motor, new pedals, in very good order; price £28.—Dubois, 362, Richmond Rd., East Twickenham. [4493]

**TRIUMPH**, 1910, 3½ h.p., Brampton gear, £19/10; 3½ h.p. mag. Triumph, new tyres, £12/10.—Motor Exchange, Horton St., Halifax. [4618]

**32** h.p. Triumph, 1912 T.T. Model, just overhauled; splendid condition; £25; can be seen any day after 7 p.m.—69, Tasman Rd., Stockwell. [X2116]

**1910-19** Triumph, 3½ h.p., Montgomery sidecar, Philipson pulley, new Pedley belt, in splendid running order; £22.—51, Parade, Leamington. [X2092]

**1914** 4 h.p. Triumph, 3-speed S.A. hub gear, lamps horn, Bramble coachbuilt sidecar, perfect order; £55.—Parker and Son, St. Ives, Hunts. [4753]

**TRIUMPH**, 1914, 3-speed, and C.B. sidecar, wind screen, all accessories, last used 1916; £45.—5 Bonheur Rd., Bedford Park. Phone: 948 Chiswick [4582]

**TRIUMPH**, 1913, £30; Triumph, 3-speed, Canoelet sidecar, extra heavy Dunlop tyres, £45; E.P. or exchange.—Service Co., 292, High Holborn, London. [4822]

**TRIUMPH**, 1914, 4 h.p., 3 speeds, clutch, coachbuilt sidecar, repainted dark blue, gold lines, in splendid condition; £50.—Forder, 79, Copenhagen St., London, N. [X2077]

**1914** Triumph Junior, new Dunlop covers and belt perfect order, complete, £30; 1913 twin 2½ h.p. Enfield, overhauled, and new covers, 2-speed, £16.—13, Nutwich Rd., Crews. [X1862]

**JUNIOR** Triumph, 2-stroke, 2-speed, 2 Lucas lamp sets, mechanical horn, standard specification, no mileage, really new condition; £38/10.—Robinson's Garage, Green St., Cambridge. [4657]

**TRIUMPH**, 1912, clutch model, engine rebushed, T.T. pulley, tyres and belt in good condition, lamps, accessories; £25; also 1911 cylinder, reground, new piston and bearing, tank cammed, new belt, lamps, horn, spares, £24, offers; call Friday.—48, Derwentwater Rd., Acton, W. [4553]

## Trump.

**TRUMP-J.A.P.**, 1914 6 h.p. twin, 3 speeds, coach built sidecar, hood, and screen, speedometer, in nice order; £35.—Percy and Co., 337, Euston Rd., London. [4806]

**TRUMP-J.A.P.**, 4 h.p. (85×85), 1914 Starmer-Archie 3-speed gear, kick starter, Watsonian coachbuilt sidecar, excellent condition; £33/10.—Eagles and Co., High St., Acton, W.3. [X2031]



# THE MOTORCYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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## Motor Cyclists in the Army.

SOME months ago we mentioned the case of a despatch rider Overseas who, originally enlisting at the rate of pay of 5s. per day, was reduced to 3s., the reduction applying retrospectively, and so far affecting his remuneration that it was found the despatch rider owed the Government a matter of £84 odd for overpay. His pay, therefore, was to be entirely stopped until this considerable amount was made good. The case was exposed, and complaints lodged by the recruit's father—who, incidentally, is a J.P.—led to a satisfactory letter from the R.E. explaining that the matter had been adjusted, and quite rightly too. The letter went on to point out that the ordinary rate of pay applying to despatch riders would be the rule from January 8th, 1917—a decision which is not at all popular among men who responded to the early appeals for despatch riders at 5s. per day.

Last week we received a letter from a despatch rider in Mesopotamia, protesting against the treatment of the D.R. to whom we have referred (he had not at the time seen the development of the position), and urging vigorous action and restoration to the rate of pay sanctioned and in effect at the date of enlistment. It has already been made clear that 5s. per day was the official rate laid down at the commencement of the war, and despatch riders were invited to enlist at this rate of pay. A month or two later the figure was reduced to 3s., so that it will be seen that only the very earliest recruits have been affected by the reduction of pay.

## Varying Rates of Pay.

Another matter brought to light by the same writer again concerns the subject of pay of despatch riders, and is the cause of much consternation among men in Mesopotamia. Motor cyclist reinforcements are sent to that country from India and Egypt as well as from England, and on arrival at the base are detailed to join

different units up country. Those riders fortunate enough to be attached to an Indian unit are entitled to receive 3 rupees 2 annas per day; others less lucky, detailed to join an English unit, are paid at the British rate of 3s. This is almost as bad as paying (as was done in the early days of the war) 6s. per day for the comparatively safe job of driving a car in the Transport Section, and 1s. per day for service in the trenches. Could anything be more unfair? Our informant goes on to say that a call is made upon infantry units in India to send desirable men for training as despatch riders. When passed for this duty and proceeding on service they receive 3 rupees 2 annas per day, irrespective of the unit they join; thus it is no uncommon thing to see men newly trained, in most cases having seen no active service, working side by side with experienced motor cyclists having 2½ years of service to their credit, and who are receiving approximately 1s. 2d. per day less than the new arrivals.

It is high time that the matters outlined were officially investigated. Too much luck and not enough merit seems to enter into the question of pay. At any rate, it is an absurd position for motor cyclists on precisely similar duties to receive varying rates of pay. Many motor cyclists are still receiving 6s. per day in the A.S.C., others get 5s. in the R.E., and latterly 2s. 6d. plus 6d. In the R.F.C. a motor cyclist receives 2s. per day, and new recruits in the M.T. get 1s. 2d. per day, rising to 2s. 4d. when proficient. 1s. 2½d. is the pay of men in the M.G.C., and many motor cyclists who are fighting in line regiments get actually less. Ordinary people cannot understand these variations of pay. In 1915 a question was asked in Parliament, and the explanation was to the effect that the rate of pay depended upon the section to which a man belonged. That "explanation" satisfied M.P.'s apparently, but every motor cyclist knew as much beforehand, and therefore was no wiser.



## SIDECAR EQUIPMENT.

A 1917 Model Outfit of Luxury which Cost £160.

The Owner's Appreciation.



A Harley-Davidson owned by Mr. Ernest B. Allport, of Birmingham, to which almost every refinement in the way of accessories has been added. The finely finished sidecar is not a standard H.D., but was made by Messrs. F. Cooper & Co.

**D**ESPITE the prohibition upon the import of foreign-made motor cycles, a certain number of 1917 Harley-Davidson machines have found their way to this country. These machines, it may be observed, were permitted to be imported by reason of the fact that the company's stock was hurriedly exhausted on one occasion to satisfy military requirements. For one thing the Harley-Davidson Co.'s readiness to give up its stock of 1916 models was, from one point of view, a boon to motor cyclists, since it has enabled motor cyclists at home to sample America's best. There cannot be many specimens of the 1917 model in Great Britain, but golden opinions reach us from users. Green drab is the distinctive finish of the new model, so that readers can readily recognise it on the road. Certainly one of the finest examples we

have seen is that owned by Ernest B. Allport, of Birmingham, whose mount, fitted with a Remy electric generator lighting-set and a special sidecar produced by Messrs. F. Cooper and Co., Belgrave Road, Birmingham, is replete with every modern accessory, its total cost being £160—surely a record for a sidecar outfit. In writing to us concerning his new acquisition, Mr. Allport says:

### Electric Equipment.

"Before owning the Harley-Davidson I had a 1916 model B.S.A. with Gloria sidecar. This outfit I exchanged through Mr. Allerton, of the Colmore Depot, for a new Harley-Davidson model 17J. The very complete electrical outfit attracted me, a magneto-generator with electric head lamp, tail lamp, plug for inspection or sidecar lamp, in conjunction with an

electric horn, promised to provide the utmost convenience on night runs, and I am pleased to report that up to the present the lighting system has given perfect satisfaction. The question of lubrication, too, I find can be banished from one's mind. One has simply to replenish the tank when it is empty, and the rest can be left to the mechanically-operated pump.

### The Result of a Slipping Clutch.

"Petrol consumption with such a powerful machine and heavy sidecar is not light, and I find averages 50 m.p.g. for ordinary town running. Still, this is a distinct saving of precious spirit when compared with a car at anything like the figure my sidecar cost. I find I can handle the Harley with the greatest ease, thanks to the clutch, which seems to be everything that can be desired. All the same, I recall one singular experience with the clutch; it happened some weeks ago in Coventry. I had been running for some miles with the clutch slipping badly, but being a novice and not knowing how to adjust the clutch I had to continue into Coventry the best way I could. After stopping to make my business call I returned to the machine and found it an impossibility to restart. After inspection I found I had burnt the clutch lining out.

"This sounded to me an awkward business, so I decided to leave the machine in Coventry for the night, and next morning visited the Colmore Depot in Birmingham. The people in charge promptly sent over a mechanic who adjusted the clutch, and we were on our way back to Birmingham in less than ten minutes.

"As regards comfort I find the Harley as satisfactory as anything I could wish for—thanks to the big wheels and big tyres, and the saddle springing.

"After 1,500 miles on my new Harley I am a delighted owner, and have no reason to doubt that my future experience will be in any way less satisfactory than hitherto."



Many people show surprise when told that the cost of this outfit was £160 and compare it with the cost of a light car. The outstanding attraction of such a combination is the pleasure derived from possessing the very finest of a type comparable in the finish of its mechanical parts, coachwork, and accessories with the most expensive car, to say nothing of its speed capabilities.





BY LION

## Getting the Wind Up.

OLD campaigner as I am now, I sometimes get the wind up about sideslip. The required conditions are a dark night, a poor lamp, an unknown road, and the brands of grease which limestone and oolite generate when they are about half dry. I peer into the gloom, I wonder whether I have taken a wrong turn, I drive timidly and jerkily: finally, I realise that my back wheel is not adhering very tenaciously, that my front wheel will lie down sideways at slight provocation, that the road is extremely hard, that my overalls are new, that Gladys will not embrace me with her usual abandon if I am miry from head to foot, and that my knees, elbows, shoulders, and knuckles bear many old scars. In about five minutes after these cogitations are complete, my wrists lose their vice-like, masterful grip: the little U tubes behind my ears cease to register balance subconsciously as they should, and long-forgotten swearwords snarl unbidden through my clenched teeth as the bicycle takes charge. By this time I am awake to the situation. I change gear downwards: the smooth purr of the accelerating exhaust suggests that the back wheel is biting earnestly into the road: confidence returns, and I drive rather faster than before.

## The U Tubes.

NO; I don't mean "U boats," gentle reader. The last time I went to a lecture on aviation I woke up, after half an hour's machine gun fire of logarithms from the professor in charge, to catch an interesting statement about the personal factor in pilots. Forty winks over my shorthand pad lost me his opening remarks; but, in effect, he said that every man had a pair of little U shaped tubes behind his ears, which gave him his sense of equilibrium. I didn't quite catch whether they were filled with mucus, or mercury, or blood; but, anyhow, some sloppy, human stuff or other perpetually tiptilts to and fro in them as your body sways around the vertical, and the resulting pressure informs your brain that you have stepped on a banana skin, or are towering in righteous rage above that fool Jones, as the case may be. To ascertain what condition these tubes are in, you simply shut both eyes and stand on one leg. If you can do this for two minutes without toppling against the sharp corner of the ancestral marble mantelpiece your U tubes are O.K. If you can't, they are afflicted by catarrh, or need grinding in, or remagnetising, or something. Well, presumably, the man who can ride a motor bicycle with a flat back tyre is the lucky possessor of a pair of perfect U tubes with jewelled mountings; and the man who sideslips on a new Triumph as soon as it begins to rain ought to get his U tubes blown out from a steam

jet, or receive other suitable medical attention. Now I have offered you two tests of your anti-sideslip efficiency—one for the road, the other for the parlour. Try them both, and if you fail in either you can see it is not much use buying that expensive steel-studded tyre you had in mind for next winter.

## A Ludicrous Phenomenon.

MR. DAVID SHARP has at last produced a plausible explanation of my puzzling case, so far as the periodic misfiring on the flat is concerned. It is fairly obvious that a silencer which caused excessive back pressure would choke the engine down exactly after the fashion of an exhaust valve which failed to open fully. The burnt charge would not be cleared properly, a full charge of fresh gas could not be inhaled: the explosions would sound muffled, and would fall off in power. As soon as the congestion in the silencer was relieved by the gas pressure seeking the only available outlet, an increased charge could be inhaled, the explosions would recover in power temporarily, fresh congestion would pile up in the silencer, and the series would recommence *ad lib.* or *ad nauseam*. But I do not quite see how Mr. Sharp's otherwise plausible theory accounts for the fact that, in each case reported to me, the misfiring disappeared absolutely when the machine encountered a hill. Off-hand, one would suggest that two errors of design exist in combination: and that the faulty silencer only accounts for half the symptoms. I do not know the particular engine concerned, and must leave it to owners to hammer the whole matter out fully.

## Machine Guns and Motor Cycles.

OUR publishers have broken out in a new spot by issuing a handbook on the Hotchkiss gun, which reminds me that thousands of our readers have found the knowledge gained from the "Blue 'Un" and its associated manuals invaluable in mastering a weapon which is even more lethal than the motor cycle, to wit, the machine gun. During their apprenticeship to the machine gun they are often heard to sigh for the simplicity of the motor cycle. Whatever accusations can be brought against the petrol engine, it keeps its strokes separate and distinct, and you can learn them and their significance one by one. Now the machine gun, by contrast, is a hoary deceiver. It poses as a two-stroke—one stroke backwards, and one forwards. Your heart warms to it, but you gradually discover that each stroke consists of about umpteen separate actions, which are perpetually overlapping and interfering with each other. Anyhow, it is some machine. The lock of the Vickers and the pawls of the Lewis are alleged to have sent more than one expert Brooklands tuner into a lunatic asylum.



# ALUMINIUM AND AIR-COOLING.

## THE EFFORTS OF THREE COVENTRY MOTOR ENGINEERS.

**L**AST week we published an article in which for the first time, so far as we are aware, an endeavour had been made to establish the originator of the use of aluminium as a cooling medium for cylinders. In that article we described how recent efforts by one would-be patentee—a motor cyclist incidentally—had brought to light the existence of a patent of 1898 standing in the name of Robert Ayton, of Coventry, another motor cyclist. This patent, as we showed, expired before the advantages of the use of a metal of high heat conductivity were appreciated—indeed, many motor manufacturers have still to appreciate the fact. Since the use of aluminium is bound to grow rapidly, in our judgment, we devote further space to this engrossing subject.

In the accompanying notes Mr. R. Ayton—whom we traced to the R.N.A.S., in which section he is a chief petty officer—replies to our letter of congratulation upon his early realisation of the properties of aluminium and its likely use upon motor cycle engines. After expressing appreciation of our "friendly enthusiasm," he says:

"In my opinion, you are quite right in backing the principle as full of promise. To me it is a link in a well-defined chain of progress. Water-cooling for aircraft engines may, I think, be safely regarded as doomed to ultimate extinction, in company with those moribund but useful stop-gaps or makeshifts, the rotary and fixed cylinder radial types of engines.

"In order that you may be in full possession of all the known facts, I send you a copy of the only document in which the use of aluminium is referred to as a material for cylinder-cooling fins. This is in the form of a specification by our old friend E. J. Pennington—no less. It is very clear that he only suggested aluminium as a possible material on account of its ductility—in fact, the amusing remark in lines twenty-eight to thirty:

Or again, the gills may be cast complete with a suitable flange or fastening device, say in two halves or even as a complete tube to fit outside the cylinder, *but as this would tend to retain the heat* I prefer to make the gills or their fastenings in skeleton form and attach them to the cylinder in the simplest manner



C.P.O. Robert Ayton, R.N.A.S., who in 1898 obtained a patent for cylinder jackets composed of metal of high heat conductivity.

## ROBERT AYTON'S IMPRESSIONS.

### E. J. PENNINGTON'S SPECIFICATION OF 1897.

shows that Mr. Pennington was innocent of any idea of the physical properties of what he was handling. He omits all mention of it from his 'final' and claims.

"Did he ever use these flanges on his few completed engines? His cylinders, as I seem to remember them, were essentially 'simple steel tubes turned up' (quotation from actual patent), and, in the gloaming on the Kenilworth Road, invariably glowed like the business end of a very large cigar.

The cottagers along his usual routes were said to derive a comfortable income from the supply of buckets of water—sort of cooling relay, as it were.

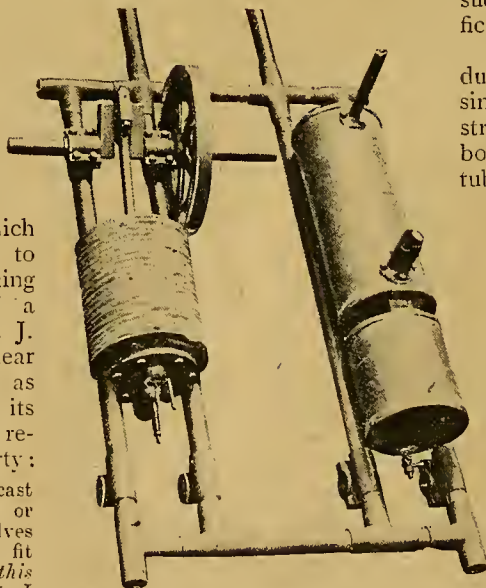
### A Recent Discovery.

"I may say that I was quite unaware of the existence of this patent of Pennington's until about four or five years ago, yet he must have lodged his application at the very time that I was burning my fingers in verifying the fact that one of the principal causes of the failure of certain aluminium-soldering attempts lay really, not in the flux or the solder, so much as in the remarkable rapidity with which the heat appeared to be drawn along the metal away from the 'bits' used. This was, I believe, at the time (circa 1897) that I was acting as assistant to W. A. Taylor, then works manager of the New Beeston Motor Co., Ltd. Taking this observation as a starting point, you will readily understand the use to which I naturally sought to put such a curious property, and my specification becomes self-explanatory.

"I built several engines of this type during the period of 1898-1902, mostly single-cylindered of 4in. bore x 7in. stroke. The fins were extended and bored for the passage of the frame tubes as shown in the photograph.

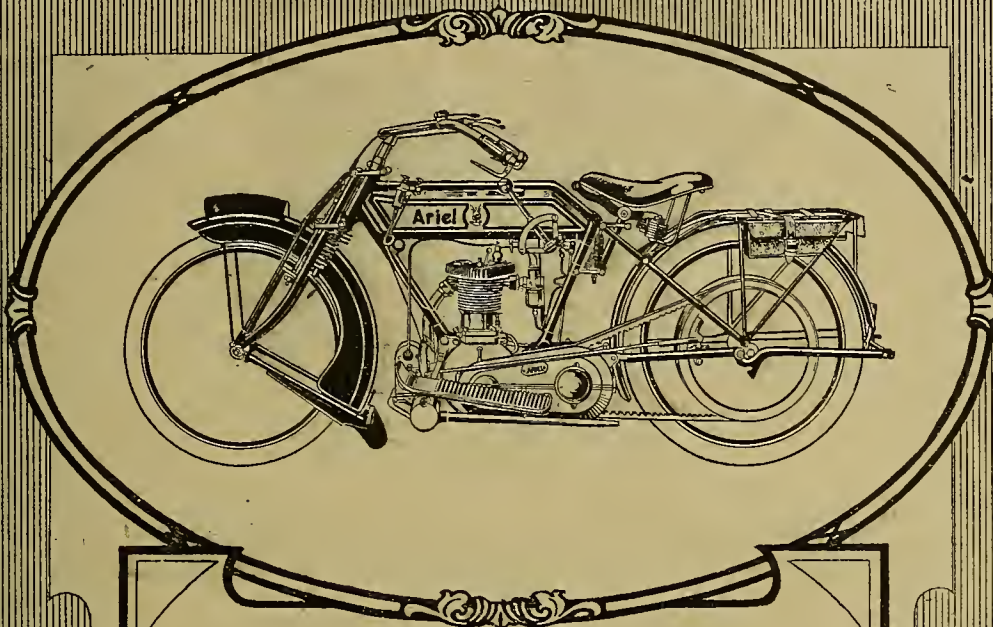
"This arrangement not only provided a light, strong, and rigid support, but provided a rapid and successful means of varying the compression—an important point in those days of tube ignition. The larger tank is the surface carburetter, fitted internally with eight wick cotton screens and a float-controlled air admission device. The smaller reservoir is the pressure tank supplying the Bunsen burner. Induction pipe and chamber, balance weights and valve gear, etc., are omitted.

"These engines were immediately and uniformly successful, ultimate failure of the first



One of the several engines built by R. Ayton between 1898-1900, having an aluminium jacket over the cylinder barrel. The fins were extended and bored for the passage of the frame tubes.





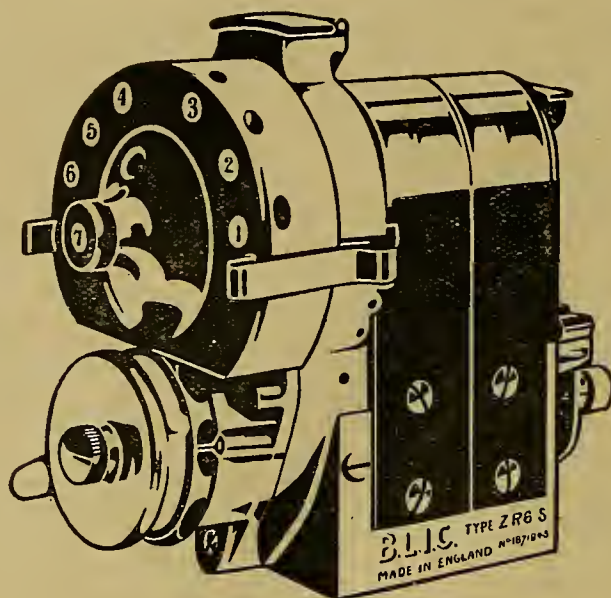
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British capital and British labour are combined in the "B.L.I.C." to produce a Magneto as perfect as it is possible to make it. In every detail it is the true embodiment of scientific Magneto design and construction.

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LTD.

(Proprietors : VICKERS LIMITED),

204, TOTTENHAM COURT ROAD, LONDON, W.1.



**Aluminium and Air-cooling.—**

one after about three years' hard work being due to breakage of the frame tubes at the plumber blocks. During this period there was never even a momentary failure due to inadequate cooling. *But—* It is written that there are two kinds of success—*le succès d'estime*, and the *succès d'exécution*. This device certainly attained the latter. Of the many firms—British and Continental—to whom it was offered, only one of the former would even take the trouble to examine and try it. That honourable exception was the Daimler Co., whose (then) managing director and chief engineer—I think the latter's name was Blake or Drake; that of the managing director was, I believe, Foster Pedley—accepted my invitation to try and 'race' the engine to a standstill in a closed apartment. I forget how many pipes we smoked between the three of us whilst waiting for the engine to seize up. She was 'glumphing' along at a steady 960 r.p.m. unloaded, full throttle and retarded ignition, so just imagine the atmosphere of that closed workshop—20ft. x 9ft., about! Radiation? Why the A.I.R. was almost as hot as the jacket before we had finished. Try it some time! I rather enjoyed it, for I had 'been over the course' several times before, and I knew the cooling wouldn't let me down. Nor did it. They got tired first. In the end I received a congratulatory letter, but the company would not take it up.

**Absence of Valve Pitting.**

"One of the most remarkable features of these engines was the absence of valve pitting, in spite of a lot of such use—or abuse—as above.

"A smaller (vertical) two-cylinder was subsequently converted to a two-stroke, and gave results which fully justified the novel design I had in hand when war broke out.

"But to hark back. It is a fact that one of the alternative fittings which I originally contemplated is the full length screwed one now employed in the Hispano-Suiza aircraft engine. I rejected it as being: (a) too dependent upon the absolute accuracy of lead screw and lathe bed, and in view of (b) the high coefficient of friction in aluminium, which in order to avoid 'gripping' in midfit in such a length, would necessitate such an 'easy fit' between liner and jacket as largely to nullify the effect of the (theoretically) extended contact surfaces.

"In the engine shown in the photograph, the jacket was cast on before the bore was finished out; just as in the aircraft engines now made for the Government by a firm that about 1902 turned down my 'flat twin' design embodying this principle. In the two previous examples (including the one tested as before related) the jacket was bored taper to correspond with the coned exterior of liner, heated, and forced up into position by a screwed ring nut on the liner nose; this entailed rather greater cost of machining, but the system proved quite satisfactory.

"Only in an engine with a high conductivity jacket have I found it possible to secure the full benefits

of a denaturised alcohol fuel, and I may be permitted to remark that the highest practical results yet attained with such a fuel are those recorded in this journal under date 12th September, 1906, as the results of joint trials by the Editors of *The Motor Cycle* and *The Autocar* in collaboration. Such a fuel—the permanent product of a hitherto undescribed reaction—must ultimately come into general use, in spite of the obstructive attitude of the Excise authorities and of the petroleum interests. The details of its preparation are—as ever—at the disposal of the nation whenever there is a reasonable prospect of supply to the public being facilitated.

"One factor in the realisation of maximum weight efficiency from any type of engine using any kind of liquid fuel is the employment of *absolutely* synchronised multi-point ignition. This implies the employment of a number of firing points in series upon one circuit, without reference to the type of apparatus employed. This principle was first described by me in Patent 23,810 of 1906, and I have been described in the columns of *The Autocar* and *The Motor Cycle* (I believe correctly) as the originator of the theory upon which this practice is based, which

now receives extended practical application year by year. It is particularly advantageous with an alcohol fuel, so that you have here, clearly displayed, the inter-relation of three of the principal original features of my work. Of the further (related) items now in hand, it is too early to speak."

In the foregoing remarks, which we are confident will be studied with interest by students of design, Mr. Ayton refers to a patent specification by Mr. E. J. Pennington; it is numbered 4,556, A.D. 1897. An extract is quoted from the provisional specification, and we repeat *in extenso* the complete specification,

and also reproduce the drawing referred to:

**COMPLETE SPECIFICATION.****Improvements in or relating to the Cooling of Cylinders of Explosion Engines.**

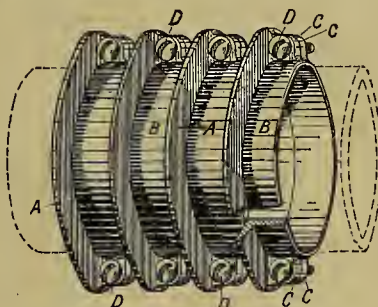
I, Edward Joel Pennington, of the Motor Mills, Coventry, in the county of Warwick, engineer, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

This invention relates to the cooling of the cylinders of explosion engines, and may be carried out in the following manner:

I provide the cylinder externally with detachable radiating plates or gills, of which the accompanying drawing is a perspective view partly broken away, showing four of the detachable gills in place upon the cylinder of an engine.

Each gill A is shown separate from its neighbours, and is either a complete ring or divided into two parts as shown in the drawings. Or the gills may be all cast or otherwise formed together and held to the cylinder together. A flange B is provided, and lugs C are formed on each half of the gill so that the two parts may be clamped around the cylinder by screws D, the position of the cylinder being indicated in the drawing by dotted lines.

The gills may be made of ductile metal, such, for example, as aluminium or gun metal, so that they can be easily bent to fit the cylinder, and they or their flanges may be run into dove-tail grooves formed in or upon the cylinder.



An early patent by Mr. E. J. Pennington, which relates to the cooling of cylinders by means of detachable radiating fins. The drawing is from a specification dated 1897.



**Aluminium and Air-cooling.—**

If desired the flanges B may be bolted direct to the cylinder, or other means than those shown may be employed for detachably fixing the gills upon the cylinder.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:

1. A detachable plate or gill substantially as and for the purpose described.

2. The combination with an explosion engine cylinder of detachable plates or gills substantially as and for the purpose described.

Dated this 4th day of June, 1937.

E. J. PENNINGTON,

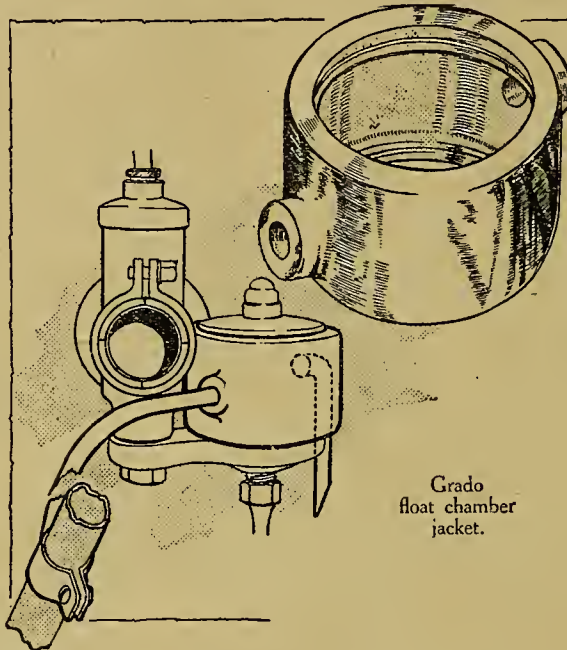
By his Attorney, John Bradley Carse.

Boult and Wade,  
Agents for the Applicant.

## HEATING THE FLOAT CHAMBER.

FROM time to time we have illustrated suggestions for heating the float chamber to assist vaporisation. There is much to be said in favour of this method, by which the temperature of the fuel is raised considerably before it is sprayed through the jet, but the benefit thus derived is counteracted to some extent by long induction pipes which tend to cool the mixture before it reaches the cylinder. This difficulty can be overcome by lagging the induction pipe with asbestos cord. As regards jacketing the float chamber, our contributors' ideas have generally consisted of a simple tin cover designed to surround the chamber with copper tubing connections to the exhaust.

The Grado Mfg. Co., of Pershore Street, Birmingham, have introduced a substantial and easily adapted fitment for float chamber heating. It takes



Grado  
float chamber  
jacket.

the form of a neat polished aluminium casting with lugs drilled to take inlet and outlet pipes. Packing glands at top and bottom ensure tight joints between the jacket and the carburettor body. Several types are to be made to suit the chief makes of carburetters, the fitment we illustrate being for an Amac. A length of tubing and clip for connecting to the exhaust will be included. This addition is of the highly desirable kind that any motor cyclist can fix to his carburettor in a short time, and it should remove many heavy fuel difficulties. The Grado paraffin vaporiser, which has been on the market for some time, is now issued in a simplified form, certain internal alterations having been

made. Its price is now 35s.; a larger type, but of similar construction, is made to suit light motor cars and Fords.

## HANDLE-BAR CONTROLS.

THE matter discussed by "The Critics" last week points towards the desirability of a general revision of handle-bar controls. We know of many riders who, though appreciating the enormous advantages of the handle-bar clutch lever, still favour the pedal operation on the grounds that they already have enough stuff on the handle-bars.

Recently we were examining an experimental machine on which both brakes are foot-operated, and placed respectively to the right and left foot of the rider. The drawbacks to this system are, firstly, that a front wheel brake, unless delicately applied, is more of a danger than a safeguard, and the nervous rider who "plonked" his foot hard on the pedal would most assuredly come to grief. Then, if both brakes are transferred to the back wheel, the object of having two of them is defeated, for the primary object of the front brake is for applying that slight extra braking effect which is to prevent the rear wheel from skidding, the maximum braking effect being at the moment when the rear wheel is almost skidding.

We have had instances of the foot-operated ignition control, perhaps not entirely happy, but the three levers which load up the bars are the clutch, which must remain where it is, the exhaust valve lifter, and the front wheel brake. There is no reason why the two latter should not, by a very simple mechanism, be interconnected, the first movement of the lever raising the valve, and a further movement applying the front wheel brake, which, after all, is seldom used, and at all events only when the engine is not required—on descending long hills, for instance.

Our experience of interconnected controls has not, perhaps, been very rosy in the past, but things are better made to-day, and the arrangement suggested might, at any rate, mean one Bowden cable less, while it would enable us to dispense with one rather useless lever, so that the rider would have but two—one on either hand: Several modern machines have combined hand and pedal control for the clutch, which system has much in its favour, and the practice is likely to grow.



**J**UST an extract from one of the hundreds of letters we receive from Despatch Riders using Triumph Motor Cycles on active service :

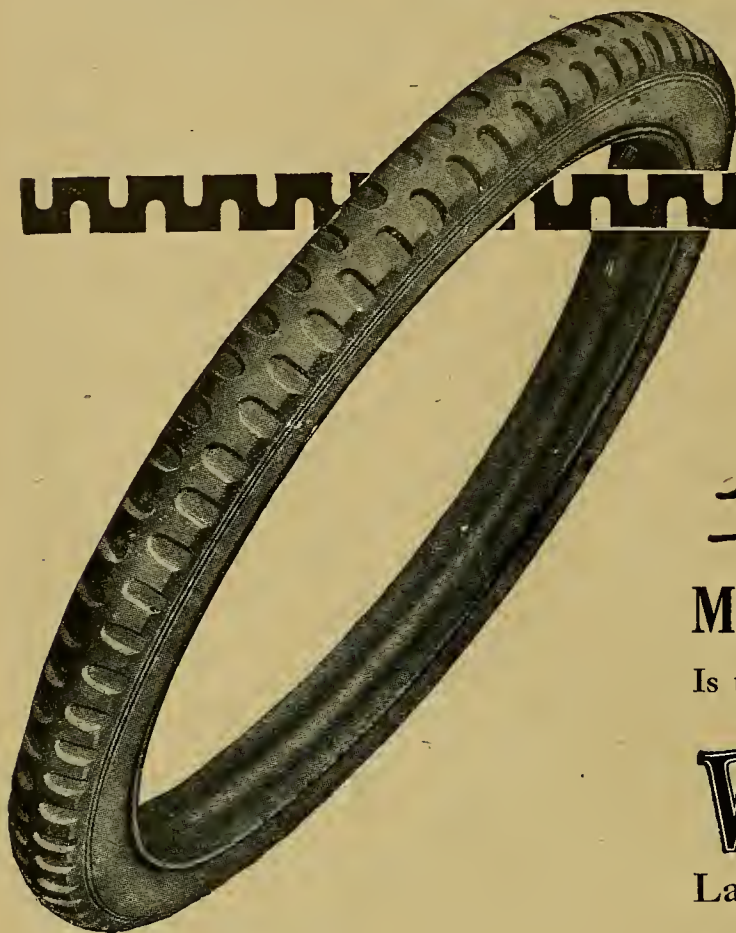
“The way the Triumph sticks it over these rough roads, and in winter through the terrible mud, speaks most highly of the good workmanship and high-class material used in the construction of Triumph Motor Cycles. Never is a D.R. more confident of delivering his messages, and returning safely, than when mounted on a

**TRIUMPH**”

For war service conditions, the simplicity and reliability of the TRUSTY TRIUMPH make it a favourite with all Despatch Riders.

**TRIUMPH CYCLE Co., Ltd., COVENTRY.**





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**Keygrip**  
 Motor Cycle Tyre

Is the latest production of the

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Laboratories and Works

If you would know what it is to be absolutely free from Tyre trouble, to be able to negotiate the "toughest" piece of road without wondering "what is going to happen next" — or finding out, then fit the new Wood-Milne "Keygrip" Tyre.

These tyres are made on the most generous lines, and the very heavy tread gives a degree of comfort hitherto unknown.

With "Keygrips" on, it is goodbye to aches from jarred wrists and back.

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**WOOD-MILNE, LTD., Preston.**

Wire—"Comfort, Preston."

'Phone—Preston 413.

**LONDON - - - Manchester Avenue, E.C.**

Wire—"Byturning, London."

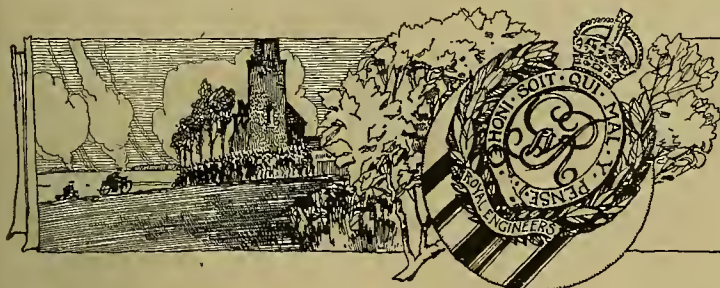
'Phone—City 4797.

**Bristol, Birmingham, Belfast, Leeds, Manchester, Glasgow, etc**



M C. 508.





## MILITARY NOTES.

### WITH THE MOTOR BOAT PATROL.

THE subject of the accompanying photograph is C. M.-M. W. Moore, who is with the Motor Boat Patrol in the Eastern Mediterranean. Moore is a motor cyclist, and has just been promoted to chief motor mechanic after sixteen months' service. Prior to enlisting he was employed by Zenith Motors,



Chief Motor-mechanic W. Moore, of the Motor Boat Patrol. His mount is a twin Zenith-Gradua.

Ltd., Weybridge, and in the photograph he is seen astride his 1915 model 4.5 h.p. Zenith, which naturally he misses very much. Last week Moore wrote to his father, mentioning how eagerly they look forward every mail day for the copy of *The Motor Cycle* which his father posts to him regularly.

### D.R.'s "IN FRONT" AND "BEHIND."

CPL. H. E. B. GOATER, writing from the Central Military Hospital, Aylesbury, confirms the statements we have made respecting the dangers run by D.R.'s. It is quite clear that there is a vast difference in the security of the various D.R. staffs, those of the Divisional Brigade Artillery coming in for their full share of trouble.

"The photograph I enclose was taken in a French village about three miles from the German trenches. As you will see, the machine is a good old trusty Triumph and heavily coated with mud.

You can imagine from its appearance the awful state of the roads and riding conditions in the fighting area in France. One could hardly have imagined the rough usage a motor cycle gets whilst running over the shelled and pot-holed roads between Brigade and Divisional Headquarters. This machine I took to France with me in the early part of 1915, and it served me faithfully without any trouble.

"With regard to casualties amongst D.R.'s. Of course only Divisional Brigade and Artillery D.R.'s work entirely in the danger zone, and even their exciting experiences are usually confined to the period when a big battle is in progress. The staff of D.R.'s on divisions and brigades is very small, as you know. All the other D.R.'s, and there are thousands of them, have more or less 'cushy' jobs miles behind the line, where they practically live in peace, and are as safe as if living in London. Some of them may be worked hard, but their life is much easier than when training in England.

"I would add that our original staff of Divisional Brigade D.R.'s were all old boys who enlisted during the first few weeks of the war, and a fine set of boys they were, too (real sports, every one of them). Unfortunately during the Loos battle, in September, 1915, my chum, Cpl. Essex, who was on Brigade Headquarters with me, was killed, so also was Cpl. Howes, another of our brigade men, whilst Cpl. Bill, of our brigade, also was badly gassed. Our luck was out, and that was the beginning of the breaking up of a happy band of D.R.'s. Since that time several of them have obtained commissions in the R.E., R.F.C., Tanks, etc., and I believe there are only two of the old boys left at the Division."



### THE THOROUGH HUN.

QUITE recently we mentioned that F. J. Watson, an M.C.C. member, who has performed conspicuously in the leading competitions mounted on Ariel motor cycles, had joined the Royal Flying Corps as second air mechanic. The other day we were advised that he is in hospital, his trouble being due to an extraordinary experience, which once again shows how thorough the Huns are in their black deeds. Watson had been dismantling a Mercedes engine—one of two having six cylinders, 160 mm. bore x 180 mm. stroke—mounted in a German battleplane brought down in France. The engine was started by a decompressor actuated by a sliding camshaft on the cylinder heads, bringing the decompressor cam into operation on the exhaust valves, as in the Ariel motor cycle engine. After Watson had been at work on the engine for a day or two the palms of his hands turned a vivid yellow, followed by a skin disease, which gave trouble for over three weeks. Only the palms of the hands changed colour, so it could not have been due to the oil. Watson considers himself extremely lucky to get off so lightly. His experience might have been a good deal worse but for the fact that the engine had been on fire, which would no doubt destroy most of the strength of the preparation on the engine, whatever it may have been. By the way, the engine above referred to has four valves per cylinder—two exhaust and two inlet—whilst the connecting rods have floating small-end bushes. Another unusual feature is the piston design; the latter are made in two parts, the piston wall being screwed to the head and welded over.

Cpl. H. E. B. Goater, R.E., who enlisted as a despatch rider early in the war, and has been through strenuous times on the Western Front.



# Current Chat

## TIMES TO LIGHT LAMPS.

SUMMER TIME.			
July 12th	...	9.42	p.m.
" 14th	...	9.41	"
" 16th	...	9.39	"
" 18th	...	9.37	"

## War-scarred Motor Cycles.

The British Red Cross Society offered for sale in our last issue a number of Rudge motor cycles returned from foreign service. Already the same society has disposed of many war-worn cars.

## Change of Address.

We have heard from the Secretary, Mr. Horace Wyatt, of the Association of British Motor and Allied Manufacturers, Ltd., to the effect that the War Office has found it necessary to commandeer his present office, and that future correspondence should be addressed to 39, St. James's Street, London, S.W.1.

## Holiday Employment for School Boys.

A public school boy, who hitherto has spent his holidays motor ploughing, but who evidently finds this rather dull, asks whether the R.F.C. can find temporary employment for school boys on vacation as despatch riders or car drivers. We have advised him to stick to ploughing, though we certainly think that organised measures might be taken to utilise the schoolboy to the best effect.

## Advertising Second-hand Machines.

A reader writes us: "May I suggest that advertisers of second-hand machines be advised to give full particulars and price of their machines, in order to save would-be purchasers trouble and expense? For instance, in a recent issue appeared an advertisement of a Royal Enfield sidecar, neither year nor price being given, but stated to be in new condition. I went to see this machine (this took a whole morning and entailed a walk of a mile and a half); when I arrived I found, although in excellent condition, the price asked for the outfit was the fabulous and ridiculous sum of £75, and it was a 1914 model. Had the year and price been stated in the advertisement I should naturally not have given it a second thought. I could also quote three other instances nearly as annoying." We fully agree with our correspondent's sensible suggestion, and we would further point out that many would-be purchasers do not trouble to investigate an offer if the date of machine is omitted. Many a good machine goes begging owing to lack of important detail in the advertisements.

## London Motor Volunteers Wanted.

We have been asked by the A.C.U. to state that they have been requested by the City of London Motor Volunteers (4th-23rd squadrons) to appeal for sidecar owners, who are urgently required as recruits. Petrol used on duty is supplied free. Applications should be addressed to Mr. A. Wright, 12, Bathurst Street, W.2.

## Race Meetings and Motor Vehicles.

That horse racing is to be allowed to continue to a limited extent is not, of course, novel news, but in a letter to the senior steward of the Jockey Club Sir Albert Stanley makes clear that suitable measures are to be taken for limit-

## SPECIAL FEATURES.

MORE SPORTING REMINISCENCES.  
ALUMINIUM AND AIR-COOLING.  
A REJUVENATED MORGAN.

ing the amount of traffic to and from the race meetings. The railway companies will not provide special trains for race-goers, and, owing to the shortage of petrol, no motor vehicles are to be used in connection with the meetings—or, rather, those who attempt to use motor vehicles will probably be called upon to forfeit their licences as a result. This is entirely in accordance with the proper order of things, against which no true sportsman can complain.



## SOUTH AFRICAN RECORD-BREAKERS.

The Johannesburg-Durban record attracts great attention in South Africa, and in some ways this now famous run may be compared to the historical Land's End-John-o'-Groat's route, which in England formerly held a similar interest for record-breakers. Some time ago the African sidecar record was broken by Enfield riders. Messrs. Bright and Keag, whose photograph we reproduce, covered the 420 miles separating the two cities in 14 hrs. 12 mins. The previous record stood at 14 hrs. 50 mins. The appearance of the riders and their 6 h.p. Enfield gives some indication of the strenuous nature of the trip.



**The National War Funds.**

At the week-end the principal relief funds stood as follow:

The National Relief Fund (distributed £3,641,622) .. ..	£6,213,333	0	0
British Red Cross Fund .. ..	7,072,574	10	7
Tobacco Fund .. ..	132,508	0	0

**Inspector of Petrol Consumption.**

It was recently announced in the *London Gazette* that Col. (temp. Brig.-Gen.) Sir C. W. King, C.B., M.V.O., has been appointed Inspector of Petrol Consumption.

**A Practical Driver.**

If every private owner took the same care of his machine as the owner of the Morgan Runabout referred to in this issue, second-hand prices might be higher still. Illustrations of a number of the improvements effected accompany the descriptive matter.

**Police Hunt for Military Sidecar.**

Police in the S.E. of London are searching for a dark-coloured low-built sidecar which it is alleged knocked down a private of the A.S.C., M.T., at Beckenham Lane, and did not stop. Both driver and passenger were soldiers. The injured man has died in hospital. It was dark at the time.

**Is a Shock Absorber Necessary?**

Recently we tried a big all-chain single, in the transmission of which no shock absorber is included. Owing to low compression and large flywheels no snatch was detectable even at very low speeds, but if the gears or the clutch were roughly handled a terrific snatch was apt to result. Certainly, for the average rider, a shock absorber is desirable for this type of machine.

**Good Opening after the War.**

There should be a good opening in agricultural circles after the war for capable mechanics having some knowledge of internal combustion engines. The use of petrol and paraffin-driven machinery on farms has increased since 1914 to an extent not generally realised. In addition to motor ploughs and tractors, portable petrol engines are now used on almost every farm, and a few days ago we visited a place where 160 cows are milked morning and night—by machinery! The machine is similar to an exaggerated vacuum-cleaner, and does the work of a whole retinue of herdsmen.

**Wastage of War.**

Thirteen Rudge Multi motor cycles offered for sale by the British Red Cross Society form a rather interesting collection. These machines, we are informed, were some of the old stagers of the 1914 campaign, and from their appearance one can quite believe it. Out of the thirteen there is only one in a really rideable condition. All are minus belts, and most of the tyres are flat. Two we noticed had only half a handle-bar, one was without cylinder and piston, some were without magnetos, and one we particularly noticed could hardly be described as a motor cycle, as only the frame and head stem remained. They are all plentifully besprinkled with Flanders mud and very rusty, which cannot be wondered at, as we understand that for the first nine months of their career they were garaged in the open and did not see a cleaning rag during the whole period.

**Still Short of Petrol.**

Shortage of supplies prevents the suggestion of petrol for munition workers' holidays being carried into effect. A letter on the subject appears in our correspondence pages.

**The Originator of Aluminium Cooling.**

*The Motor Cycle*, having tracked down the originator of aluminium as a cooling medium for air-cooled engines, is able this week to publish the views of the patentee. C.P.O. Ayton has seen no direct benefit from his early recognition of the usefulness of aluminium for the purpose named, as he was before his time, the patent he held expiring before the advantages of the system he protected became recognised.

**A Convert.**

When a few days ago an experienced rider of high-powered machines, who has long scoffed at the baby two-stroke, was compelled to undertake a sixty-mile journey on one of these diminutive machines, we awaited with interest his comments. He confessed himself utterly surprised at the capabilities of the little mount, and is now to be seen daily using it as a business hack. We have a shrewd suspicion he has bought it!

**Spanish-built Cycle Cars.**

There seems to be quite a boom in cycle cars in Spain, one make—the David—being produced in fair quantities. In view of the state of Spanish roads it will be interesting to observe their performances after a twelvemonth existence. We acknowledge that many defects of the early cycle cars produced in this country have been eliminated, so that there is a reasonable chance of success.

**The Cycle and Motor Trades Benevolent Fund.**

The hon. treasurer's report at the last meeting showed that for the first eight months of the current financial year the expenditure on relief and administration had been £2,234, as against £1,799 for the corresponding period of last year. Not only had the number of applications for relief increased considerably as a direct result of the war, but the increased cost of living had made it necessary for the committee to grant larger amounts to individual beneficiaries than would otherwise have been required.

**Week-end Weather.**

The weather during the week-end appears to have been uniformly unsettled, and a member of our staff, who set out on a 180 mile road test of a new model, experienced a fair share of it. The machine was an overhead valve T.T., with chain-cum-belt transmission, and on the outward journey it proved at least 10 m.p.h. faster than the all-chain single ridden by a companion. On the return journey, through pouring rain, the chain-drive machine showed itself capable of maintaining the much higher average of the two—belt slip being, of course, the explanation. The experience served to back the old decision that belts will slip, however carefully the transmission be designed, though for fine weather riding the belt is probably preferable.

**Strikes Stop Racing in Spain.**

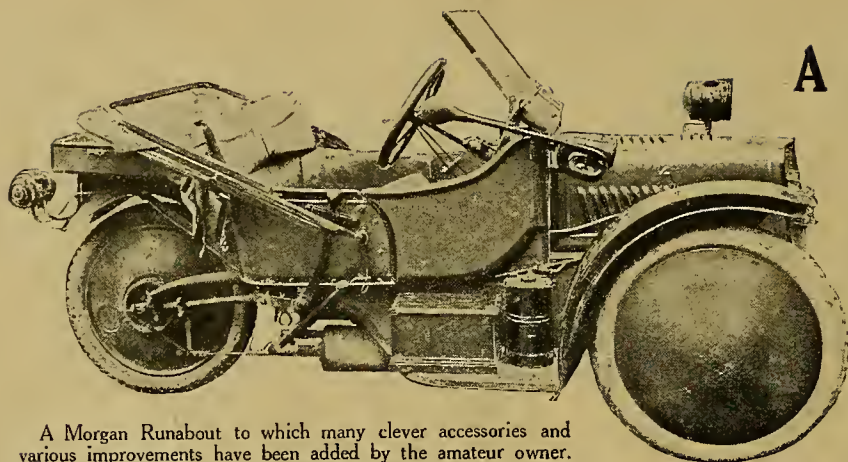
Cycle car and motor cycle racing on the open road is a usual thing in Spain nowadays. An important long-distance event from Barcelona to Bilbao and back was arranged for the beginning of the month, but the event had to be postponed, by order of the authorities, owing to the unrest in Spain. Strikes are, or were, prevalent in the North of Spain. There were thirty-two sporting type cycle cars among the entries—none of them British, however.

**AVERAGE PRICES.**

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average. The word "combination" indicates a sidecar outfit as supplied complete by the makers.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3½ 2-speed .....	—	£40
A.J.S. ....	1916	6 combination ..	—	£92
" .....	1914	6 combination ..	£60	£49
" .....	1916	4 combination ..	—	£78
Allon .....	1916	2½ 2-speed .....	—	£30
" .....	1914	2½ 2-speed .....	£25	£28
Ariel .....	1915	3½ 3-speed .....	—	£43
" .....	1914	5-6 combination ..	—	£51
Bat .....	1914	6 3-speed .....	—	£48
Bradbury ..	1914	4 2-sp. sidecar ..	£35	£43
Brough .....	1916	3½ 2-speed .....	£50	£56
" .....	1915	3½ 2-speed .....	£50	£46
B.S.A. ....	1916	4½ sidecar .....	£65	£64
" .....	1915	4½ sidecar .....	£60	£57
Calthorpe ..	1916	2 2-speed .....	—	£30
" .....	1915	2 2-speed .....	£27	£26
" .....	1916	2 2-stroke .....	£26	£26
Clyno .....	1915	2 2-stroke .....	—	£26
" .....	1914	6 combination ..	£64	£62
Connaught ..	1915	2½ 2-stroke .....	—	£25
Douglas .....	1916	2½ 2-speed .....	£46	£47
" .....	1915	2½ 2-speed .....	£40	£41
" .....	1914	2½ 2-speed .....	£36	£33
Enfield .....	1916	6 combination ..	£70	£84
" .....	1915	6 combination ..	—	£63
" .....	1916	3 2-speed .....	£45	£44
H.-Davidson ..	1916	7 combination ..	—	£84
" .....	1915	7 combination ..	£65	£68
Henderson ..	1916	7 combination ..	—	£100
Hazlewood ..	1914	6 3-speed .....	—	£39
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	5 combination ..	£64	£64
" .....	1916	7-9 combination ..	£77	£78
" .....	1915	7-9 combination ..	£69	£66
James .....	1916	4½ combination ..	£55	£69
" .....	1916	2-sp. 2-stroke ..	—	£31
Lea-Francis ..	1916	3½ 3-sp. sidecar ..	—	£67
Levis .....	1916	2½ Popular .....	—	£26
" .....	1915	2½ Popular .....	£21	£21
Matchless ..	1915	7 combination ..	—	£70
New Hudson ..	1916	2-sp. 2-stroke ..	—	£28
" .....	1916	4 combination ..	£54	£48
New Imperial ..	1916	2½ 2-speed .....	£35	£32
" .....	1915	2½ 2-speed .....	—	£24
Norton .....	1916	3½ 2-speed .....	—	£52
" .....	1915	3½ T.T. ....	£43	£45
O.K. ....	1916	2½ 2-stroke .....	—	£20
P. & M. ....	1915	3½ combination ..	—	£65
" .....	1914	3½ combination ..	—	£52
Premier .....	1915	2½ 3-speed .....	—	£28
" .....	1914	3½ 3-speed .....	£45	£45
Rover .....	1916	3½ 3-speed .....	—	£52
Royal Ruby ..	1916	2½ 2-stroke .....	—	£24
Rudge .....	1916	3 Multi .....	£46	£46
" .....	1915	3 Multi .....	£45	£35
Scott .....	1916	3½ combination ..	£55	£60
Sun .....	1915	2½ 2-speed .....	—	£23
Sunbeam .....	1916	8 combination ..	—	£100
" .....	1916	3½ solo .....	£76	£72
" .....	1915	3½ combination ..	£73	£80
Triumph .....	1916	2-sp. 2-stroke ..	£38	£37
" .....	1915	4 countershaft ..	—	£55
Velocette .....	1916	2½ 2-sp. 2-stroke ..	—	£30
" .....	1915	2½ 2-sp. 2-stroke ..	£25	£25
Zenith .....	1915	8 Gradua .....	£60	£62





A Morgan Runabout to which many clever accessories and various improvements have been added by the amateur owner. They are detailed in the accompanying notes.

## A REJUVENATED AN ENTHUSIAST'S NUMEROUS

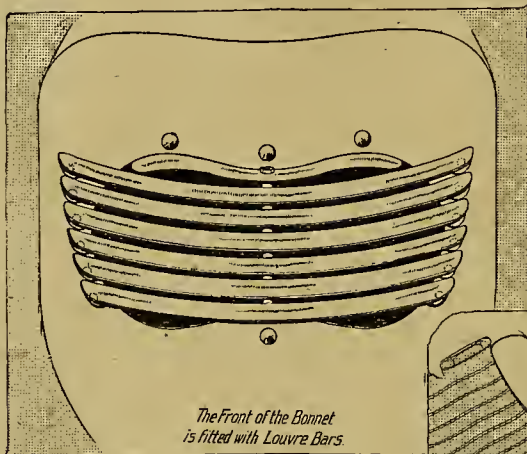
THERE is no production of motor world which may be considered to have reached absolute finality. Makers of light cars and motorcycles often realise this, and, incidentally, profit at times from the comments or suggestions of practical riders. There are, moreover, few things which interest the rider of a particular machine more deeply than read about the improvements and additions made by a clever enthusiast of the same make. Each of the special fittings adapted to the Morgan Runabout here described is well carried out, and might almost be taken for standard work by the maker.

### Bonnet and Fan.

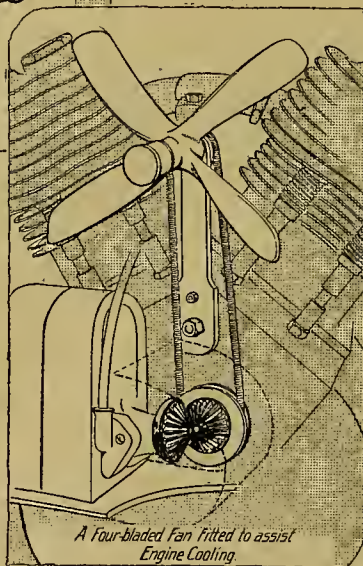
The machine was, originally, a standard Morgan Runabout, carrying all usual Morgan arrangements. Its date is not certain, but it is several years old, although its excellent condition leads one to suppose it to be of recent origin.

The first noticeable innovation is the bonnet. This is provided with a large number of louvres on the top and sides, and the usual space in front has a series of new-made louvre bars fitted across it. All this work is very well done and smartly finished. In lifting the bonnet a four-bladed aluminium fan stands prominently, driven by a spring belt from a pulley behind the magneto bevel driving gear. This addition has proved extremely beneficial in the matter of engine cooling. The drive absorbs practically no power.

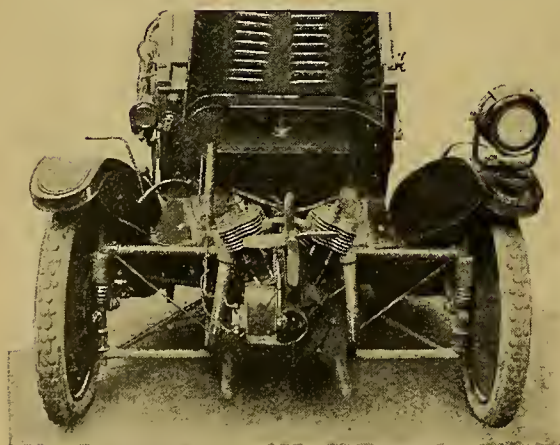
The silencers are usually placed below the engine, but these have been removed and pipes taken to the back to separate exhaust from either side. This alteration results in a very quiet running engine; the lubricating oil tank has been arranged on the dashboard with a sight feed plunger pump, the former



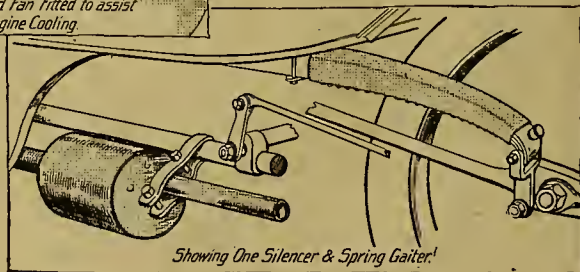
*The Front of the Bonnet is fitted with Louvre Bars.*



*A Four-bladed Fan fitted to assist Engine Cooling.*



The four-bladed fan (modelled on the lines of an aeroplane propeller) is driven by a spring belt from a pulley behind the magneto driving bevel. It is found very efficient in practice.



*Showing One Silencer & Spring Gaiter!*



# MORGAN RUNABOUT.

## OWNER DRIVER'S IMPROVEMENTS.

Reservoir being taken into the petrol tank, thereby increasing the capacity. The dash has been fitted with a sliding extension carrying an adjustable screen of ample dimensions; the seat backs have been increased in height by fitting a 6in. leather band and fitting a black green leather cover to match the upholstery.

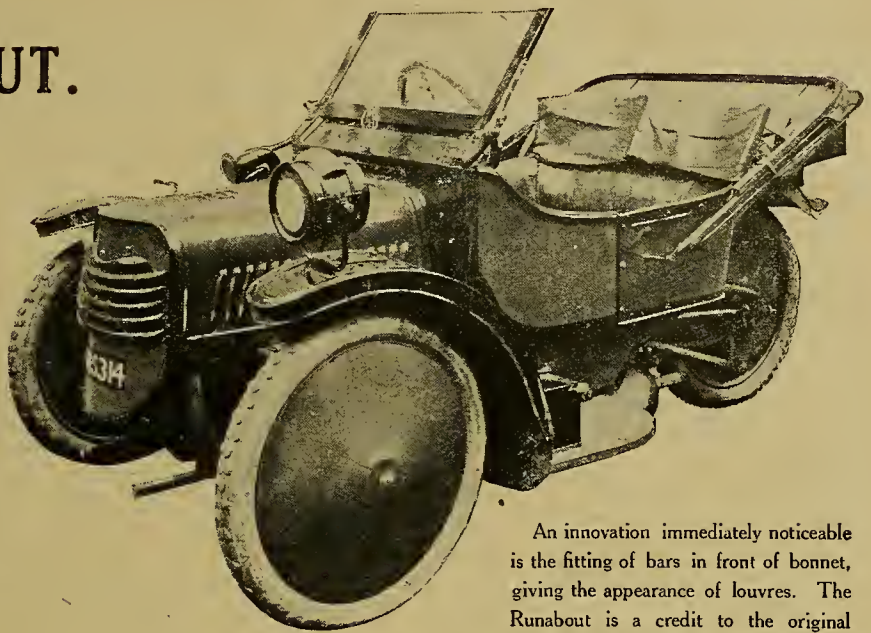
### Carrying Spares.

A large flat box mounted on a strong mild iron frame over the back mud-guard carries spare tubes, etc., while extra tool kits are formed under the seat; this gives an unusual amount of storage room for tools and kit, all easily accessible.

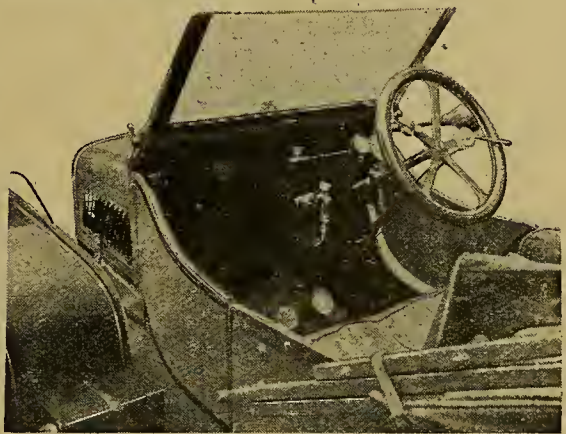
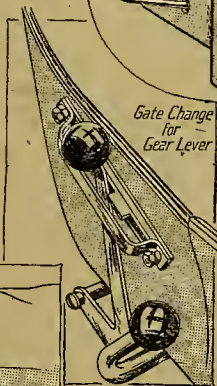
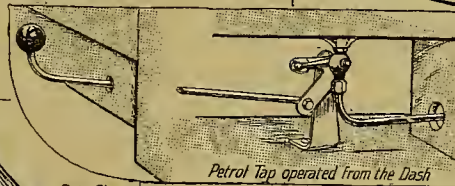
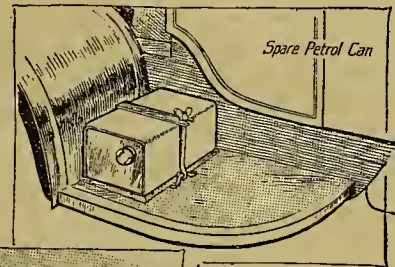
A neat footboard on the passenger side carries a spare petrol tin. A good point is the protection of the rear lights by enclosing them in laced-up leather gaiters. A Binks carburetter fitted. Still further, an extra large clutch and brake pedals make for eased driving comfort.

There is no need to lift the bonnet to turn the petrol on or off; a lever arrangement has been fitted to operate the petrol tap from the dash. A gate change for the gear lever in a more handy position than that originally chosen is another good feature which is well worthy of note.

These are the principal additions made by the previous owner to this fine runabout, and serve to show what scope there is for ingenuity in improving a standard model. The machine can be seen at any time at the Motor Depot, John Bright Street, Birmingham, whose courtesy we were permitted to examine it. The sketches on this and the following page show very clearly the alterations which have been so carefully carried out. It will be noted, also, by reference to the photographs, that disc wheels have been fitted throughout. Miss Hough, of the Motor Staff, speaks of this particular vehicle as the best Morgan she has handled, and her experience is by no means small.



An innovation immediately noticeable is the fitting of bars in front of bonnet, giving the appearance of louvres. The Runabout is a credit to the original owner, as it is about four years old.

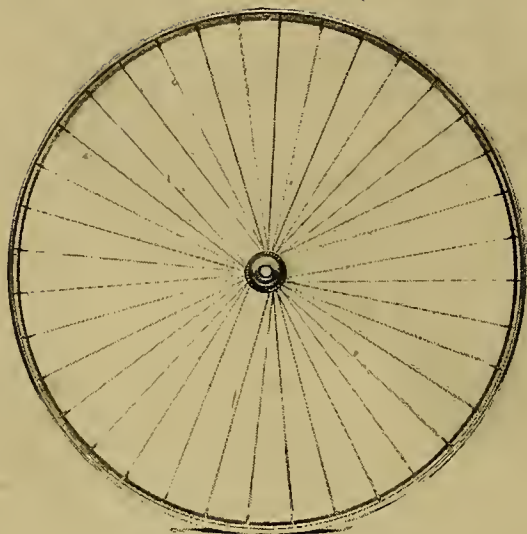


The lubricating oil tank has been placed on the dashboard, and in consequence a greater capacity given to the petrol tank.



## Fan Tangent Wheel.

A NEW METHOD OF ARRANGING THE SPOKES.



Starley's patent fan tangent wheel.

**W**E have on several occasions referred to inventions by Mr. Starley, recent examples which our readers will call to mind being a tubular wheel and a front fork stamped from sheet metal. On this page we illustrate a new method of building wheels for motor cycles. Comparing this wheel with the usual tangent wheel, it is claimed that the spokes are shorter, and the wheel therefore lighter; it is quicker and easier to build; the breaking of a spoke does not affect the wheel, and it is more easily replaced—in fact, the replacement of a spoke in the usual interlaced tangent wheel is no easy matter; it is easy to clean; the belt rim can lie flat against the spokes, and the nipples exert a straight pull on the rim. A glance at the illustration shows that the lubricator in the centre of the wheel will be more than usually accessible, and that the wheel is pleasing in appearance.

The matter of appearance is, of course, not of much importance, as the spokes of a motor cycle cannot be seen when the machine is in motion, still it appeals to many persons.

## Detachable Dome Water Jacket.

Discussing a Possible Weakness in the New Scott Sociable.

**W**HEN first the writer became acquainted with the engine of the new Scott Sociable, something in its novelty of construction struck him as familiar, but in this engine, bristling with new ideas, it was difficult to locate the one part which was not exactly new. Now I have suddenly awakened to the fact that it is the ingenious and accessible manner in which the water jackets are slipped over the cylinder castings and held down thereto by the sparking plug and compression tap nipples. No amount of frost can lead to a cracked cylinder, which is a casting complete in itself, the water jacket being, as it were, merely a hood, pulled down over the cylinder casting and anchored there by the aforesaid nipples, the joint at the base consisting of a thick rubber ring.

Some years ago, before the two-stroke boom was even dreamt of in this country, I used occasionally to borrow a rowing boat—converted into a "gasolene launch"—from a neighbouring settler 'way back in a certain pioneer locality. In return for the loan of the boat I used to keep the engine in decent trim, and I recall that one minor defect which could never be cured was the leaking of water round the rubber joint which formed the point of contact between the detachable copper water jacket and the crank case casting. The water jacket of this engine, made in a pioneer city by a pioneer engineering firm, was held down in exactly the same way as the detachable water jacket of the Scott Sociable engine, but with this difference, whereas one was made of copper, the other was made of aluminium.

I believe that Mr. Scott, being an engineer of the first water, has allowed for the varying expansion of the metals used, but has he allowed for the various

whimsicalities of the thick rubber joint? And does the constant tightening up of this joint necessitate the use of a hefty hexagon spanner every time a blob of water appears adjacent to that eternal rubber joint? If so, I venture to prophesy that one will never be rid of that blob of water, and, though the leakage is negligible, it is not pleasant to look upon.

The motor boat engine referred to was designed for use in a country where keen night frosts are the common order, and I can vouch for the fact that the water contained in the jackets used, as a regular thing, to freeze solid, whereupon the engine was thawed out by pouring scalding water over the induction pipe, and starting up.

CHINOOK.



Canadian motor machine gunners aboard a Clyno machine gun sidecar. They are receiving a course of instruction at one of the M.M.G. training centres.



## ARIELS FOR THE ALLIES.

An All-green Model having Various Refinements.



A batch of  $3\frac{1}{2}$  h.p. Ariels destined for one of our Allies. A combined hand and foot clutch is fitted, also other minor alterations have been made.

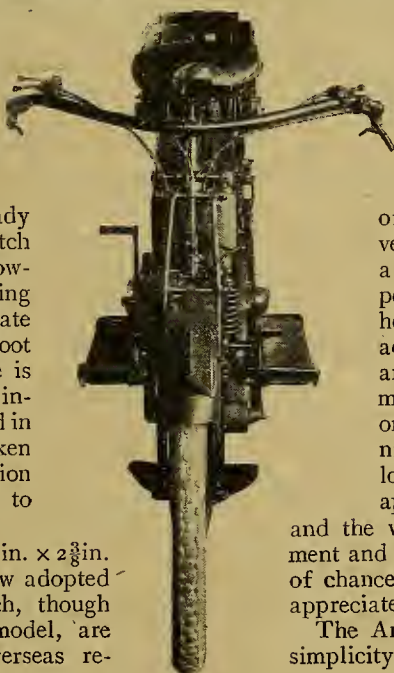
YET another well known make of machine—popular alike among speedmen and the more sober-minded type of rider—to assume the garments of service green is the  $3\frac{1}{2}$  h.p. Ariel. The new model, however, departs from standard Ariel practice only in one or two minor respects, the engine and gear box remaining as hitherto, and it may be as well just to run over the detail alterations that have taken place.

It will be seen from our photographs that semi-T.T. bars of attractive design are now adopted, while the machine is, of course, finished in the green paint already familiar to our readers. Duplicate clutch control has been incorporated, the Bowden wire from the handle-bar lever having its point of attachment under the plate of the pedal, situated to the right foot of the rider, so that a double leverage is obtained for the hand clutch. It is intended that the pedal and clutch be used in conjunction, for unless the slack be taken up by the hand lever, speedy destruction of the inner wire at a point adjacent to the pedal would occur.

Dunlop heavy rubber-studded 26in.  $\times$  2 $\frac{3}{8}$ in. tyres are fitted, and the carburetter now adopted is the Amac. The gear ratios—which, though rather low for an ordinary touring model, are probably ideal for military and Overseas re-

quirements—are  $5\frac{1}{2}$ ,  $8\frac{3}{4}$ , and  $16\frac{1}{2}$  to 1. With these ratios, and with the excellent Ariel clutch to ease the engine when accelerating rapidly, very little gear changing should prove necessary.

The handle-bars of the military model are of new design, giving a comfortable riding position and excellent control



The late Ariel single-cylinder model presents several unique features which, though perhaps not entirely new to all our readers, are nevertheless worthy of passing mention while dealing with this excellent mount. The saddle is suspended on a spring pillar, which should prove an excellent substitute for a spring frame in so far as the comfort

of the rider is concerned. Starting is very much eased by the incorporation of a decompressor, operated by a bell crank pedal situated comfortably to the right heel of the rider. The design of the adjustable tappets is such that no tools are required to effect the necessary adjustment, milled discs, which engage with one another by means of a ratchet mechanism, answering the purpose of the usual lock nuts. This is a point which not only appeals to the novice—to whom the right

and the wrong way of locking the usual adjustment and of obtaining the results desired is a game of chance—but also to the experienced rider who appreciates the value of simplicity.

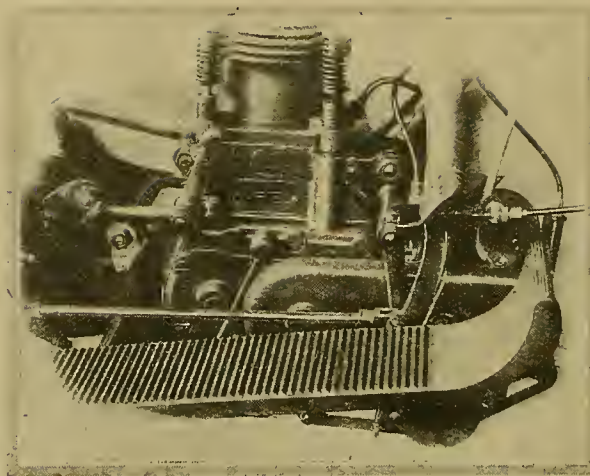
The Ariel gear box is another fine example of simplicity and accessibility. The necessary



### Ariels for the Allies.—

adjustments can be made in a very few seconds, and there is no likelihood of the merest novice going far wrong with these adjustments. One thing the rider should guard against, however, is to avoid too close an adjustment of the push rod, as, if the clutch plates are separated a needless distance, they are apt to over-ride the castellations. The clutch is extremely sweet in operation, and can be adjusted exactly to the requisite tension, so that it is as well to bear in mind that it is not necessary for the movement of the push rod to do more than just separate the plates.

The Ariel  $3\frac{1}{2}$  h.p. has already stood the fiery test of military usage, and from one Italian correspondent comes excellent news of the service this machine has rendered.



The point of connection between the Bowden hand control and the clutch pedal. Note also the bell crank lever for decompressor and adjustable tappet mechanism.

### PIONEER MOTORIST AS PARLIAMENTARY CANDIDATE.

THE new Conservative candidate for Central Hackney is Lt.-Commander W. G. Windham, R.N., a pioneer motorist who has had a distinguished career in many parts of the world. On the occasion of the wreck of the troopship *Warren Hastings*, Commander Windham swam ashore through a stormy sea, carrying a line by which the ropes were hauled ashore, over which some 1,200 people were drawn into safety. As a motorist he took part in the first official run from London to Brighton, and his knowledge of the industry brought about his appointment as one of the first officers of the original Army Motor Corps.

### DAMAGE IN PUBLIC GARAGES.

RIDERS are slowly realising that some risk of damage is entailed by leaving the modern machine in a public garage. For many years past our typical mount might safely be left unattended anywhere, and the worst damage which any mischievous or inquisitive person was likely to inflict was the flooding of the crank case with oil. When three-speed hubs came in they did not suffer from the attentions of those 'fidgety fools who cannot look at a machine without pulling all the levers. Nowadays the conditions are different. We have electric dynamos on many machines, kick-starters on nearly all, and usually a three-speed gear box. All these are direct invitations to the meddlesome loafer. He switches on the lamps, and if a single experiment cannot do much harm, a dozen curious visitors can easily run a battery down when the dynamo is stationary. The kick-starter suggests starting up the engine, and the next step is to try the gears. In ordinary times the staff of a

garage keeps a more or less watchful eye on the machines stored therein, but war staffs are less reliable, and we have heard of many machines put out of action whilst standing in public garages during the last month. It remains to be settled whether the machine of the future shall be designed to be meddler-proof or whether the proprietors of a garage shall be trusted to maintain an efficient watch. It is true that the garage proprietors are liable in any case, but the burden of proof is very real. For example, some loafer recently stripped the gears of one of my own machines, and it was quite impossible to prove either

(a) that the machine was perfect when I brought it in, or (b) that I had not myself stripped the gears in preparations to start next morning. ROAD RIDER.

### YOUNGER MOTOR DRIVERS.

THE desirability of temporarily lowering the minimum age for the holding of motor car driving licences has been under the consideration of the Commercial Motor Users' Association, and at the request of the Local Government Board a memorandum has been submitted. The Association suggests that the licence be issued only to a male person between the ages of sixteen and seventeen years on the written certificate of an employer that the applicant is a fit person to be licensed.

### Death of Mr. W. I. Iliffe, J.P.

WE deeply regret to have to record the death of Mr. William Iliffe, the founder and senior partner of Iliffe and Sons Ltd., the proprietors of *The Motor Cycle* and sister journals. Although for some years past he had taken no very active part in the management of the business, which owed so much to his foresight, his keen interest in it and in the modern developments of new forms of locomotion was maintained to the last.

Mr. Iliffe was of a retiring disposition, and while taking little public part in the municipal affairs of his native city (Coventry), he did a great deal of quiet unostentatious work in connection with various organisations for social betterment. His aid in this direction was not limited to mere financial assistance, but he was always prepared to give the valuable help of his full business experience and energy.

Latterly his health had been failing, but he was able to follow his usual pursuits almost uninterruptedly, dying in his sleep on the morning of July 5th at the age of 74.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### SIDESLIP.

Sir,—With many machines the frame appears to get twisted, which causes the machine to fall to one side on letting go the handle-bars. This means that a slight pressure is constantly required on the handle-bars, which makes the steering bad on greasy roads, as it prevents the possibility of holding on lightly. The trick of riding over greasy roads is to hold on lightly, and the twisted frame has caused several of my sideslips.

R.E.C.

Camberley.

#### SPRINGING THE SIDECAR WHEEL.

Sir,—The article contributed by your correspondent, "Chinook," on the above subject is of special interest at the present moment, on account of the rough condition of the roads.

The springing device suggested by him is, without doubt, the best of the whole illustrations in his article. It is not, however, altogether new, as at the present moment I have one being tested which is identical, with the exception that the spring is half elliptical instead of quarter elliptical, as shown in *The Motor Cycle*. This, however, is not new, as I had one constructed some four years ago, and which was submitted to the military authorities on a gun carriage, the springing being absolutely perfect.

H. SARGINSON.

Sir,—I was much interested in the article in your issue of June 28th by "Chinook." It seems to me, however, that the old Chater-Lea arrangement was far simpler, lighter, cheaper, and just as effective as any of the devices shown. It consisted of a lever mounted on cone bearings, carrying the wheel spindle at one end and suspended by spiral springs (the tension of which was adjustable) at the other. I had this fitted to an outfit which I had built in 1904, and used it for years. It made a marked difference to the comfort, and never got out of order; moreover, I quite agree that it had the effect of relieving the stresses in the connections, which, in those days, were pretty flimsy. There is, however, another point of equal if not greater importance that should be considered by designers, and that is the question of a sidecar brake. Springing, of course, makes this more difficult, but some kind of hub brake, like the Chamberlain, should solve the problem.

D. ELYARD BROWN.

#### TECHNICAL JOURNALS FOR THE FRONT.

Sir,—It may interest you and your readers to know that there has been a splendid response to the request for technical papers for distribution amongst officers and ranks in the Motor Transport section of the Army Service Corps, Overseas.

A very large number of technical papers have been received, and parcels are being despatched on Friday of each week, and from the officer in France who has kindly taken charge of their distribution we have just heard that "The first batch of technical journals has been received and distributed to the principal M.T., A.S.C., units in France. A record is being kept of the numbers and titles of papers received, as well as to whom they have been distributed, and in view of the very large number of M.T. units in France, it would be very difficult to send too many papers."

Any further copies which your readers can spare will be most acceptable. These should be addressed to the Business Manager, *Motor Traction*, 20, Tudor Street, London, E.C.4.

We feel sure the officers and ranks of the M.T., A.S.C., Overseas will greatly appreciate any publicity which you can give to the above in your columns.

MOTOR TRACTION PUBLISHING CO., LTD.

#### WHY DOES AN ENGINE KONK?

Sir,—Permit me to congratulate your correspondent, Frank Smith, upon a remarkable mental feat. "I have not," he tells us, "seen anyone advance the theory which I hold on this subject." Consequently it is impossible for us to entertain the idea that he has even seen the article entitled "Overheating," which appeared in your issue dated April 8th, 1908—an article of which "Ixion" was good enough to remark subsequently that "every motor cyclist ought to read, learn, and digest" it.

Comparison will at once establish the fact that Mr. Smith's letter is an epitome of the median section of that article of over nine years ago, with the added illustration of the Diesel engine.

That observation of, and reflection upon, a number of familiar phenomena should lead to identical conclusions on the part of isolated observers would not call for comment. That a number of varying factors of no very obvious relationship should be equally taken into consideration under such circumstances is more remarkable. But that similar conclusions should be drawn and marshalled in the same order, with no greater essential difference than that due to form of expression, is probably little short of a minor journalistic phenomenon.

R. AYTON.

#### SPARKING PLUG DESIGN.

Sir,—"H.B." replies to my criticism on his statements *re* four-point plugs, and asserts that I doubt the fact of electrical resistance increasing with the rise in temperature, and suggests an elementary manual as a means of enlightenment.

I wish to point out to "H.B." that, being by profession an electrical engineer to a Metropolitan supply undertaking, I now have no use for elementary manuals, as electrical problems are part of my daily routine.

If he reads my previous letter correctly, he will find that I said: "Considering the high voltage, the increased resistance would be negligible."

For our worthy friend's special edification, I will give a few little simple data to prove this. The specific resistance of annealed iron at 0° C. is 9.065 per cm. cube.

Let R = resistance of metal.

A = cross sectional area in sq. cms.

B = length of metal in cms.

C = specific resistance of metal.

$$\text{Then } R = \frac{BC}{A}$$

Length of plug point, say, 4.76 mm. Cross section, 1.167 mm.

$$\text{Then } R = \frac{.476 \text{ cm.} \times 9.065}{.1167 \text{ cm.}} = 36.9746 \text{ microhms.} \\ = .0000369746 \text{ ohm.}$$

The specific resistance of pure metals increases with the rise in temperature. The formula by which one can calculate the resistance at a given temperature from its known resistance at another temperature is:

Where  $R_2$  = resistance at 100° C.

$R_1$  = resistance at 0° C.

B = difference in temperature in degrees C.

A = mean temperature coefficient 0° to 100° C.

$$R_2 = R_1 \{1 + AB\} = .00006 \text{ ohm.}$$

"H.B." has surely sufficient electrical knowledge to see now that .00006 ohm. is a negligible resistance at 8,000 volts, or 80 volts for that matter.



Even assuming the temperature of the plug points to attain treble this heat the resistance is still of no consequence.

However, the principal point of my argument, which he ignores entirely, was that the elongation of the electrode would more than counterbalance the increased resistance, a point which, by the way, I should not have raised had I doubted the variation of resistance with temperature theory.

The linear coefficient of expansion of iron per degree F. = .000007; therefore at 100° C. this would be .00126.

The expansion of plug point  $\frac{3}{16}$  in. long would = .00024 in.

From this it may be seen that the elongation question is certainly of more account than the increase of .00006 ohm, but neither is of any consequence in actual practice.

The above dimensions of plug points, etc., are only approximations, but are sufficiently accurate to prove the absurdity of "H.B.'s" statements.

Now, with reference to his remarks to the effect that the plugs whose points are "built in" from the body become hotter as the heat has further to be conducted, does "H.B." wish us to believe that the further heat travels the greater the temperature of the conductor? This, of course, is against all laws of heat and conductivity as applied to metals. It is evident that the outer electrodes, being in direct contact with the cylinder, which, by the way, is provided with cooling flanges, will require a much greater heat to raise it to the same temperature as the smaller centre electrode.

In illustration of my point, let "H.B." hold in a flame the points of an ordinary domestic pin and a large hat-pin and see which will burn his fingers first.

A. WARD.

#### PETROL FOR HOLIDAYS.

Sir,—It has just occurred to me, as manager of a munition factory which will be closing down at August time for the usual holidays of stocktaking and repairs, that there are some of our employees, both male and female, to whom a little recreation or visit to the country might be beneficial, for it would renew their energies for more work after they resume business.

Now a lot of these are owners of motor cycles. They have spent practically the whole of their capital in an article that they cannot use at the present time, and I have no doubt that there are hundreds more factories that are in the same position, namely, closing down for holidays and repairs. The workpeople will be away, and if they had a little petrol for use during this one week in August it would be a boon, and would take away a lot of the feeling that has been created against the Petrol Control Board, and members of the Government generally, on account of the restrictions that have been put on them. Cannot some of the big people in the motor cycling world approach someone in power to grant this small concession to genuine munition workers? Surely it can be done.

I am not writing this on behalf of myself, as, unfortunately, I shall have to be at the works stocktaking and on repairs. What do you think? Can anything be done for the Britisher who, although not able to go to the Front, has been just as hard at work as some of the Tommies in France?

J. LUCKETT.

[The possibility of making some such concession as outlined in the above letter has already been suggested to the Controller, and very sympathetically considered by him. He has, however, been unable to recommend that special allowances be made to the munition workers by reason of the serious petrol situation and national needs.—ED.]

#### BALL BEARING CONNECTING RODS.

Sir,—I have read with much interest the letters on this subject, and your leading article, which also refers to the same question. It does not seem to me that the two principal contestants are likely to come to an agreement, for, as you say, both writers are right from their own points of view; moreover, they are apparently reluctant to look at any other.

I do not follow "Picardy Pitt's" statement to the effect that "the crank pin centre is a point fixed outside the circle of the crankshaft, and is therefore concentric," especially when he says a few lines lower that "this piston circle, being within the circle described by the cylinders, is eccentric thereto." Again, the eccentricity does not represent "the distance the pistons reciprocate along the cylinders," but only half of this distance.

JOHN HOLLAND.

#### POST-WAR MOTOR CYCLES.

Sir,—We have had the views of the expert on post-war models, but very little support from the purely pleasure rider, who is probably the most important buyer to cater for. As a driver of motor cycles, mostly big twins, for ten years, possibly my experience may be of some little use to makers who really desire to meet the requirements of the man who uses his machine, not only for the pleasure of driving, but as a means to an end, which is, in most cases, fresh fields and pastures new.

As a matter of fact "Ixiom" has from time to time so clearly voiced our needs, that had makers only taken his suggestions as seriously as they deserved to be taken there would have been no need to put our case personally.

I write now only as a big twin driver, but whether single or twin the first consideration from the buyer's point of view is, without a doubt, price, and unless makers will be able to turn out machines at very much cheaper prices than even before the war, they had better turn their attention to other matters. I do not hesitate to assert that a very large proportion of pre-war buyers did so only by making considerable sacrifices, and it being very certain that the cost of living, rates, taxes, etc., will be considerably higher, it follows that there will be less—considerably less—money to spend on pleasure.

We shall expect to get the very best single and sidecar for £50 and the best twin outfit all on for £75. It is no use telling us that it cannot be done. Many years ago I paid £26 for a large wheel, a very small one, a piece of bent iron, and a few yards of solid rubber: to-day a far better and more complicated machine can be bought for £5 5s., and it was the American invasion that was instrumental in waking up the British maker. Let the maker beware lest history repeat itself! As regards post-war models, though the V twin will certainly take one anywhere, and there is considerable choice, I have not yet seen any V twin that was fit to sit on at any pace under 20 m.p.h., but there are times when passing over bad roads, or through lovely scenery, when you want to go your own pace, and not that of the engine's best speed. I do not look on the V twin as the be-all and end-all, but as the car evolved from one to two and from two to four and is still adding cylinders: I certainly consider that the next ideal is the four-cylinder machine. I must confess that I never heard of the Dennell before you illustrated it recently. Poor fellow! he was ten years before his time; but I think that if this machine were remodelled it would provide the best problem as a passenger machine, and I should prefer the three to the four for obvious reasons, provided that the engine were properly balanced; the cylinders should have air space between as shown; Scott's girder frame would be ideal for this engine; the seat, which should be bucket, should be a properly sprung seat, which would take the place of spring frames. Objection may be made to the three cylinders, but in practice this is quite sound. About the same period Cottereau, who was in his day an authority on car construction, built a three-cylinder car. I toured for three weeks in Scotland, with two other men and a heavy camping outfit, on this type. The car ran perfectly throughout the whole tour; the engine was well balanced, very quiet, and the fact that it was light on tyres speaks for itself; the car spent nearly every night in the open, yet never gave any trouble. I certainly think that the Dennell is worth the attention of makers, but for heaven's sake let us have twist grips, and not a lot of wretched taps to twiddle—with twist grips one can feel the very soul of the engine, with the lever one feels utterly detached. Do makers realise how many men drive American machines for this reason?

The flat twin will appeal to anyone with mechanical knowledge, but if it is going to be as complicated as it looks, and probably very expensive, it will only be within reach of the favoured few.

For my own particular fad, I sigh and sigh in vain for the 5 h.p. three-speed Scott, which would embody all the advantages of the four-cylinder without its complications.

Just a word in conclusion: spring frames, or properly insulated seats and foot-boards, for after-the-war roads, please; rigid frames should be things of the past for passenger work. I have had enough of watching my passenger's seraphic smile, whilst my spine is being reduced to pulp.

PATER.

Whitefield, Lanes.



## SPARKING PLUG DESIGN.

Sir,—I have read with interest several letters about the Bosch four-point plug with the central electrode split into four ends, and also "Ixion's" remarks on it in last week's issue. I would like to add my experience of this particular plug.

A friend of mine made me a present of two of them, and I think that he must have had trouble, as when I used them they were anything but satisfactory. I tried all manner of adjustments, but at the best perfect running was only of short duration.

I decided to scrap them, but before I did so I took them to pieces, and wondered what could possibly be the advantage of four points when the spark could only use one gap at a time. So I cut three of the points off and adjusted the remaining point to .4 mm., and found, or imagined, that I had a fatter and hotter spark than ever I got from the four points. It has also proved to be so in practice, and I have never had the slightest signs of sooting up even after a twenty-five mile run, and using a quart of thin gas engine oil in this distance. I may say that my engine is a 4 h.p. Bradbury, and the gas engine oil was the only kind I could get to bring me home. The plug burned itself clean at the point, and is, like "Charley's Aunt," still running.

I think there is a lot to be said for the single-point plug, where the central electrode is one piece up to the terminal and sparking direct on to the main body of the plug.

Southport.

J. MILNER.

Sir,—On page 574 in *The Motor Cycle* of June 21st "W.F.W." attempts to reply to a previous correspondent on a type of Bosch plug. For a sensible reply I refer him to "Ixion" on the same date, who sticks to the real issue, the central electrode.

To split this portion of the plug at the point may be right or wrong, according to what happened in the process.

What is certain is that no plug with "jointed" centre-piece or earthing points is ever satisfactory. I paid 16s. for four plugs. One I threw away in disgust; one I have which sparks outside but not inside the cylinder; and one that does not spark in or out, neither on car nor cycle. The other I sold to an enemy of mine for 2s. in tin box sealed and unopened. All were guaranteed.

If "W.F.W." condemns the non-detachable insulator I am with him, as the same fault develops on English and foreign alike.

At present I am using one of the split point plugs under discussion, and I find it fires on all four points, and has done so for years. The other plug is the same brand as my 8 h.p. engine.

In both cases the central electrode is in one piece and can be removed easily, and both spark direct on the plug body. The principle is the same. No other type has been of any use to me.

J. G. BALSHAW.

## AN IDEAL MOUNT FOR A LADY.

Sir,—I must say that I do not agree with a letter which "Cadet" sent in to June 21st issue of *The Motor Cycle* re a nice lightweight for a lady munition worker, in which he states that he thinks a four-stroke would be more suitable than a two-stroke. Also I do not think that the reasons he gives are quite right. I think in many ways a two-stroke would be far more suitable for a lady rider who has not ridden a motor bicycle before than a four-stroke. The first reason that "Cadet" gives is that more miles per gallon are obtained on a four-stroke than a two-stroke. Certainly this is true to a certain extent, for the machines he mentions will do about 115 m.p.g., whereas a two-stroke in good order will do about 95 m.p.g.; but really the difference is not very much. The second reason he gives is that starting is easier on a four-stroke than on a two-stroke, but he also states that the machine should have a clutch and kick starter; with a kick starter this difficulty would be eliminated. The third reason he gives is greater speed attained by a four-stroke. Well, I have had experience with both light four-strokes and two-strokes, and think that a two-stroke when well tuned will do quite 35 to 40 m.p.h. on the level, whereas a light four-stroke will do about 45 m.p.h.; but surely a lady rider does not want to exceed 35 m.p.h. Of course, his fourth reason is a more nasty one to deal with, but, provided that good lubricating oil is used and the engine is not over-lubricated, the engine ought not to want decarbonising in less

than every 600 miles, besides any garage would do this in a few hours. Of course, there are disadvantages, such as

- (1) Cylinder more apt to get heated quickly.
- (2) Crank case always having to be kept compression-tight.
- (3) Quick formation of carbon deposit.

But I think the advantages outweigh the disadvantages, some advantages being

- (1) No valves to look after.
- (2) More evenness of torque.
- (3) Greater simplicity.
- (4) Lighter.

Also a two-stroke will climb hills better than a four-stroke of same h.p. and same gear ratio; in fact, I think more satisfaction would be got by the lady rider who had never ridden before with a two-stroke than with a four-stroke. I am, of course, saying nothing against light four-strokes, for I think they are excellent little machines.

H.C.T.P.

Abingdon.

## EXCESSIVE CHARGES.

Sir,—A short time ago I had the misfortune to smash my hub gear, and, wishing to get the repairs effected as quickly and economically as possible, I obtained from the Triumph Co. (the makers of my cycle) their spare parts list, and asked the Sturmey-Archer Gear Co. and two engineering companies who constantly advertise in your excellent paper as experts in repairs to these gears for quotations for the parts required, viz., compound cage, right-hand cage, long sliding pinion, and four right-hand pinions. The prices obtained were as follow:

	Triumph Co.	Sturmey-Archer Gear Co.	1st Engineering Company.	2nd Engineering Company.
Compound Cage ...	16/8	16/3 (12/6 + 30%)	35/-	30/-
R.H. Cage .....	6/8	6/6 (5/- + 30%)	12/6	12/6
Long Sliding Pinion	4/8	4/7 (3/6 + 30%)	7/6	8/6
4 R.H. Pinions ...	4/-	3/11 (3/- + 30%)	10/-	8/-
	£1 12 0	£1 11 3	£3 5 0	£2 19 0

If the Triumph Co. and the makers of the gear can supply at prices practically identical there is no excuse for others charging over 100% more.

Personally, I shall have nothing more to do with these two firms.

Glasgow.

DISGUSTED.

## SPARE PARTS.

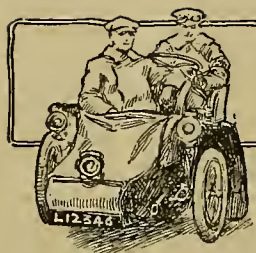
Sir,—Nine months ago I procured a motor cycle and sidecar. Almost simultaneously I began reading your excellent paper. This, together with the books therein advertised, has inculcated ideas and hints which I have found invaluable indeed.

Having procured the combination, I have now endeavoured to carry out the advice as to the "spares" one should carry or have ready to hand. Among other things I have procured a valve truer, made by a well-known motor accessories company. The feeding screw has no centre point provided, and an otherwise smart little tool is blemished, *vide* the fact that it is thereby almost impossible to produce a true face. I am having a conversion made. My "bus" is made by makers world-known for the excellence of their manufactures. They have sent me on two piston rings, which have been turned to proper circle to give the necessary "spring" pressure on surface of cylinder, but it is highly evident that the "powers" that he had not enforced the need of having the rings closed and "re-turned" to suit the bore of the cylinders. The point is a most important one if proper compression is aimed at. Without this proper precaution had compression is assured, heated crank case will result, and an altogether unjustifiable condition of things be set up.

I have the greatest respect for the manner in which the internal parts of the machine have been finished, and feel positively convinced that the original rings sent with the machine must have been carefully re-turned. If so, why should the workmen be so careless when spares are under consideration? In these days of enforced economy, and when petrol is so costly, one would naturally think that makers would vie with each other in the production of perfect parts.

DAVID SHARP.





## SPORTING MORE REMINISCENCES

TROUBLES MAINLY TIRESOME. By Veteran.

BEING THE SEVENTH INSTALMENT OF THE SERIES.

Previous articles appeared in our issues of April 13th, June 15th, Sept. 14th, Dec. 21st, 1916; March 1st and May 3rd, 1917.

**T**HIS yarn is concerned with an involuntary elopement. One of my pals proposed taking his wife to Hastings for August, and as she could not drive, the puzzle was to get his motor bicycle and tricar down there. Would I drive one of them, in return for a dinner and a first-class ticket back to town? Of course I would. He put me on the tricar, with his wife in front. *En route* we lost him, and one of the front tubes came unstuck at the join. I have mended tube joints successfully at the roadside before now, but his repair outfit was of the fine old crusted order, and I made a mess of that job. 10 p.m. saw us outside a roadside inn, with the tube worse than ever. The local cycle repairer had no 26in. tubes, but he had a 28in. and we covenanted with him to reduce it to a 26in. and to post it through the inn letterbox whilst we snatched a little slumber. We came down at 5 a.m. to find that repairer did not understand that tyres are measured by the diameter, and that you must take  $2 \times 3.1416$  in. off the circumference of a 28in. tube to convert it into a 26in. As a result, he had only shortened it by 2in., and we could not tuck the superfluous 4in. of tube into the cover. By this time Esmeralda was almost in hysterics from wondering what her husband would say, and she insisted on my driving her twenty-two miles in that tricar with one front wheel tyreless. Being at that date a bachelor I did not know how to manage a tearful woman, and I did her bidding; my wrists ache to-day when I think of it. But I laughed last. When we reached Hastings we found her husband very comfortably asleep, and her rage at finding him so stoical over her possible demise was delicious to witness.

### The Tricar that Upset.

Tricars generally gave one a little tyre excitement. In the concluding stages of the tricar epoch I owned a very powerful machine which was very nearly perfect in every respect save one. If the back tyre deflated gradually, one naturally spotted what was up in time to prevent things happening. But it is literally true that if its back tyre deflated suddenly, one had precisely two alternatives, viz., either to upset in the middle of the road, or to charge the roadside. The technical reason was that the springs of the rear wheel did not permit the wheel to remain vertical when the dragging cover was squeezed over to one side or the other. With the wheel thus aslant, one could only drive the car towards that side of the road remote from the dragging cover. If one turned sharply, the tricar upset; if one let it keep nearly straight, it eventually charged the ditch, hedge, wall, or what not. In actual practice, one let oneself be guided by events; an upset was preferable to ramming a stone wall; but a soft ditch was better than a capsize on macadam. The first time I upset through trying to right the car

hastily. Three thousand miles later I took a somewhat nettlesome ditch. The third tyre burst occasioned a permanent breach between myself and a young, charming, and wealthy damozel of whom I was at the time much enamoured. It happened thuswise.

### Ker-blinkety-blunk.

Getting a brief holiday, I went to see her. Somewhere in Hampshire the back tyre burst; as there were walls about, I elected to capsize, and got up with a few immaterial cuts. I left the tricar in a barn, and trained on. When the new tyre arrived, she came down with me to fit it. The new tyre was a size too small for the rim, but I thought it might be forced on, and I laboured for an hour or two in a boiling sun, but in vain. Amaryllis had wandered away as my language warmed up, but when she had inspected the neighbourhood pretty thoroughly, she returned. "Won't it go on, darling?" I arose in my righteous wrath. "Does the blankety, blankety thing *look* as if it were blankety going on?" Amaryllis haughtily informed me she intended to marry a gentleman, and stalked off to the station with her chin in the air. Heigho! I suppose I deserved it; but motorists will sympathise with me; anyhow, it is just as well. Many parallel circumstances have arisen in my motoring experiences since then, and if she had often spoken in that tone I should certainly have murdered her. My conscience smites me much more that I sold the tricar; I ought to have burnt it, but I was a poor man. A long list of victims stands to its credit since then, but it achieved immortality when its fifth owner stuffed the rear tyre with a patent air substitute resembling grass-green sausage meat in appearance, as he said triumphantly, "It *can't* burst now!" This was true; instead of bursting it now leaks a loathsome trail of grass-green sausage meat at intervals; it takes four men of beef and brawn with crowbars to get the new tubes of green stuffing on to the rim; but, as its owner says, he bought it very cheaply, and capsizing was its one and only fault. But, between you and me, dear reader, that green stuffing is a jolly poor substitute for air, and the bumps are past belief.

### An Expensive Journey.

My worst day on record with tyres was with a car. It had six detachable wheels, and it so happened that the six covers were all nearing their dotage when need arose one blazing summer day to drive from Coventry to Bath and back within daylight. We pushed the car along very fast, and the sun expanded the air in the tubes, and the poor aged covers proved unequal to speed and heat. It sounds incredible, but we managed to burst all six covers on the double journey, and did in more than that number of tubes, seeing that we bought a new tube and dropped the old one for





## PASSENGER MOTOR CYCLES OF TEN YEARS AGO.

The instalment of "More Sporting Reminiscences" in this issue is chiefly concerning the days of the tricar. Many were the adventures in the early trials when the now defunct tricar was popular. The photograph depicts a scene during the A.C.C. (now A.C.U.) trials ten years ago. Among the makes of tricars recognisable are the Rex, Lagonda, and Riley.

repair at the next garage encountered after a tyre stop, picking up the repaired tubes on the return trip. Altogether that run cost me about £30.

A very dark night provided me with an experience and a trophy. I was picking my way homeward through the gloom in the North Country on a 5 h.p. Vindec and sidecar—no bad outfit, as things went then. But for some reason the engine refused to pull properly. Time was pressing, and it would run after a sort; the fog was getting thicker every minute, and a rapid inspection had revealed nothing amiss anywhere with the engine, carburetter, or ignition. So we reached home without effecting a diagnosis. Next morning's light showed that a lump of road metal had lodged firmly between the front tyre and the forks, thus applying a permanent brake. The curious thing about the incident was that the stone bore an exact replica of the tread of the tyre. It seemed incomprehensible that the rubber should wear the stone, until one reflected that the lump of stone was about 2in. across, and the tyre measured over 6ft. round. In other words, one may seek a parallel in an old-time machine on which the belt buffed the head off a certain protruding crank case bolt of chilled steel.

**Solid Tyres.**

I suppose that replacing solid tyres on prehistoric motor cars was probably the toughest job in the tyre line known to man. I never owned a car of the 3½ h.p. Benz persuasion, but I begged runs in one occasionally, and one of my dimmest memories is that of four men, including myself, struggling in the dark near River Hill with a solid tyre which had come off the hind wheel of a Benz Victoria. The wheel looms in my memory as if it had been 6ft. in diameter—actually I suppose it cannot have been more than 3ft. 6in. Anyhow, on numerous occasions we got about 4in. of that very tough tyre back into place, and always when the last inch looked like snicking home the other 4in. would leap gleefully off the rim and catapult its sinuous self into the darkness. I can, however, go one better than this. In those dark and

early days there was a pneumatic tyre known as the Collier, which never punctured, for the simple reason that its immense tread was made of solid rubber as thick as a brick, and much stiffer. This merit was rather compensated by the mode of attaching the tyre. Sunk in its boardlike edges were forty-eight little steel bolts, each of which had to be coaxed through a little hole in the wheel rim, after which forty-eight little nuts and forty-eight more little locknuts were applied, supposing there was any thread left on the forty-eight little bolts by the time they were forced through their forty-eight holes in the rim. Thus not only could this tyre hardly puncture, but if it did you could drive on it, for nothing short of T.N.T. would fetch it out of the rim; it took four men to get it off, even when the ninety-six nuts were removed. Well, one wet night, somewhere out on Romney Marsh, I and another man, whose very name and lineaments escape me, fitted a new 5in. Collier tyre to, I think, a big Daimler. 'Twas a weary job, readers, but when that tyre was on we knew it was all right for at least 5,000 miles.

In conclusion, may I say how I envy those bright boys who can drive a motor bicycle on the rim when all else fails? I have often tried to do so, but for one thing I cannot steer with a tyreless back wheel, and for another I cannot stick the vibration. I once got home by padding a damaged tubeless cover with straw. The latest tip under these circumstances, as published in one of America's bright and breezy journals, is to drill holes in a million whisky corks with a red hot skewer, thread the corks on copper wire, and fasten them round the rim. Next, please!

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# THE Critic



## Fireside Chats on Motor Cycle Problems

### SAVING PETROL.

"I AM beginning to think I am an awful juggins with regard to motor cycles," frankly confessed the Novice, and, ignoring the muttered cheers of approval from the D.R., he proceeded: "Is it possible for an ordinary touring 3½ h.p. single, with the proper amount of kick behind it, to do 110 miles or thereabouts to one gallon of petrol?"

"Absolutely possible."

The Novice regarded the Journalist sceptically. "You are a competition rider, or something next door," he observed. "I am an ordinary roadfarer. What I want to know is, can the ordinary novice, like myself, obtain such results?"

"Most decidedly," stated the Journalist. "You seem to think that we fellows, to whom motor cycling is more or less of a business, are capable of exercising some superhuman influence over our machines, whereas it is merely a matter of watching the small points, which the ordinary man ignores. Small points count for everything in petrol consumption."

"Hur!" growled the Novice. "It seems to me that if you are going to get the big kick you must get the stuff through."

Here the Manufacturer became interested. "It isn't only the petrol which actually propels your machine which makes a hole in your permit," he observed. "It's the scores of petty wastages which occur on every machine unless watched. Take your carburetter—

#### Wasteful Carburetters.

"If the level is a shade too high you are apt to waste petrol wholesale, and the same applies if your needle valve requires grinding in, or if it is apt to stick. Too large a jet again affects your consumption enormously, but you must not think you can save petrol by fitting an undersize jet, which is almost, though not quite, as wasteful as an oversize."

"But let us take it that the carburetter is in proper tune," broke in the Novice, fearing one of the Manufacturer's long-winded speeches. "Mine is, I know; yet I can't do more than 80 m.p.g."

"Probably," said the Manufacturer, "you are losing petrol in a dozen ways. I suppose you flood to start?"

"Of course. Can't start without."

"Way number one! This means that you fill the whole float chamber with petrol, much of which runs to waste. It is much less wasteful to inject three or four drops through the compression Cap, or you can do it as follows. Turn on the petrol for, say, ten seconds, then turn it off again. Then rapidly depress the float by means of the 'tickle' three or four times, and the agitation in the

float chamber will cause petrol to spirt through the jet, having just the same effect as flooding. Or lean the machine over in the direction of the jet —"

"Or," stated the D.R., "if the carburetter is placed lengthwise, push the machine to the nearest 1 in 5 gradient or stand it on end against the house. My opinion is that jolly little petrol is lost in flooding unless you are stopping and starting constantly, and flooding copiously with every start. Far more fuel is lost by weak inlet valve springs, which cause blow-back through the carburetter, scattering petrol broadcast all the time you are running. That is one of the reasons why a hot-air intake generally improves one's consumption—by catching the blow-back from the air port and utilising it. Incidentally it is why a multi-cylinder engine, which maintains a constant suction on the carburetter, is more economical than a 'one-lunger.'"

"That sounds quite scientific," said the Manufacturer, "but my experience, and that of many another, points the other way and shows the single to be the most economical engine on the market, the heat losses being less in the larger cylinder."

#### Common Leakage.

"Again," put in the Journalist, "petrol is lost wholesale by filling the tank brim full—particularly in hot weather and over present-day pot-holes. Sometimes it can be seen simply spirting out of the tank ventilation, while the screw-down needles, adjusted from the top of the tank, are a common cause of leakage. The old-fashioned tap on the pipe itself is the best for economy, and you want to watch the tank fittings very carefully if after high m.p.g."

"Quite right," agreed the D.R. "I once purchased a new carburetter—a three-jet instrument, supposed to give marvellous m.p.g. Trying it, I got 60 m.p.g., which wouldn't do at all. By dint of careful adjustment, revision of jets, hot air intake, and so on, I got it up to 80 m.p.g., which I knew to be the maximum, so far as the carburetter was concerned. I then set out to discover every possible leakage by filling my tank with a half and half mixture of paraffin and petrol. My Aunt! Leaks, hitherto invisible, spirted into existence at every conceivable corner! The stopper leaked, the carburetter sprayed fuel everywhere—which was evident from the mess it made of my right trouser leg—the tank boss leaked, and at every bump a blob shot out of the tank vent."

#### Curious Facts.

The Journalist was sniffing, and evidently had something to say. "Let me tell you one or two facts about petrol consumption that may surprise you," he began. "A car is more economical for the weight it carries than a motor cycle, and a lorry more economical than a car. Why? Because a motor cycle is over-engineered, and, consequently, does not make the best of its engine. It uses its throttle lever instead of its change-speed gear. On cars and lorries we have smaller engines, running on a fixed throttle practically all the time, as it were, and using their gears on every gradient. On motor cycles everything is done by the throttle. Shall I tell you how you could beat all records on petrol consumption with a motor cycle?"

"Yes, please," said the Novice.

"Oh, do," pleaded the D.R.

"The tip's worth £50," stated the Manufacturer.

#### A £50 Tip.

"Well, just this," explained the Journalist. "Find a suitably shaped hill up which you can just manage to blind on top, with the engine pulling at its best, and the descent of which the machine will just run with gravity. On reaching the summit, stop your engine and simultaneously switch into neutral, free-wheeling down the other side."

Silence fell, broken only by the triumphant chuckles of the journalist, to whom terseness and the silencing of his fellow creatures was a real joy in life.

"Look here," broke in the D.R. at length. "We're out for the ordinary novice, and you won't save his pocket by telling him to build a road up one side of a conical hill and down the other. We have so far arrived at about ten different ways in which petrol is commonly wasted. There is one way more. Taking it that his machine is perfect in every way, a gifted rider will produce 120 m.p.g. at 33 m.p.h., where an average novice sticks at 88 m.p.g. and 23 m.p.h. Everything depends upon the rider—his judgment, his judicious handling of the controls, his art in taking corners at speed, yet without risk, and so on. The clumsy, ungifted rider will be beaten every time by the man with a natural aptitude. It is the man with the gift who tips the beam. Motor cyclists are born, not trained. So be it. Kindly pass the cigars before I get up and help myself!"

And the Journalist, knowing what it meant when the D.R. helped himself, got up promptly and politely passed the cigars.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## A Neighbourly Turn.

**?** Is it a contravention of any Act for me to present, absolutely free of charge, my neighbour with a tin of petrol?—Y.J.

No. There is no contravention of any Act in your doing this.

## Application for Renewals.

**?** I have a Douglas motor cycle, used for the distribution of newspapers. The left-hand ball bearing cup is broken, and I cannot get it mended. Can you advise me as to whether it is possible to get a certificate from the Minister of Munitions, so that I can get the Douglas people either to put in a new cup or supply me with a new wheel?—R.W.

Obtain from a post office a Munitions Form of Priority Certificate, fill it in stating what part you require, the name of the manufacturers, and the purpose for which you want the machine, and post it with a brief letter of explanation to the Ministry of Munitions, Priority Branch, 1, Caxton House, Westminster, London, S.W.1. If the Ministry sanction the order for the new part, you will be able to obtain it from the makers of your machine.

## Oil Leakage from Timing Case.

**?** My machine is a  $3\frac{1}{2}$  h.p. single, and I have experienced trouble with the oil working up the magneto drive, and then being thrown all over the gear box and my overalls. The crankshaft runs on ball bearings, and there are five holes from the crank case to timing gear. Could I fill up some of these holes? If so, what would be an easy way of doing this without taking the crank case down?—R.K.

We should recommend you to fit a fibre washer over the shaft which protrudes from the case and which drives the magneto. The washer need only be cut through one side and sprung over the shaft, being secured to the chain case by a couple of short screws. If there is room inside the case, let it revolve on the sprocket boss with its edge just inside the case, then oil which collects on it will be flung back inside the case.

Another method to prevent oil running along this shaft is to drill and tap a hole in the underside of the case, just above the bottom run of the engine chain sprocket, so that the latter still runs in an oil bath, and is not allowed to get dry. In the hole screw a short piece of pipe to lead excess oil to the ground.

## Misfiring on Hills.

**?** (1.) Can you explain the cause of my 4 h.p. 1915 Bradbury (all chain drive) misfiring on hills on high gear, and finally stopping if not changed down? This is a quite recent occurrence, as it easily climbed some of those hills on high gear a few weeks ago. (2.) What is the cause of the frequent breakage of spokes on the chain side of the back wheel of this machine? (3.) Who made the fastest lap and with what machine in the last Senior T.T. race?—T.M.C.

It is rather difficult to explain what is the cause of the misfiring on hills on high gear without a personal trial of the machine. It may be due to one of the following causes: (1.) The jet of the carburetter may be too small. Supply pipe or jet may be stopped up. Sparking plug may be faulty. Magneto contacts may require cleaning and adjusting. (2.) Frequent breakage of spokes on the chain side points to the drive being harsh, to spokes too brittle, or not of heavy enough gauge. (3.) The fastest lap in the Senior T.T. race of 1914 was made by H. O. Wood, riding a  $3\frac{3}{4}$  h.p. Scott. Time, 42m. 16s. = 53.23 m.p.h. See *The Motor Cycle*, May 28th, 1914.

## A Warped Cylinder.

**?** I have a 1915 4 h.p. Triumph, with Sturmey-Archer counter-shaft gears. On running, say, three or four miles, the crank case gets exceedingly hot, especially when running about 30-35 m.p.h., when it gets too hot to bear the hands on. I thought at first that compression was getting past the rings but have since fitted new rings. How can I increase the speed, as it is rather wanting in power when sidecar is attached, and I have to change speed for very slight hills? The compression is good.—A.V.R.

You need not be alarmed at the crank case becoming hot. Aluminium is a good conductor of heat, and absorbs a good deal from the cylinder. There is probably a slight escape of gas past the piston rings, which does not matter much, though it may indicate—as you have fitted new rings—that the cylinder is worn slightly oval. Very few engines will allow the bare hands to be placed on the crank case after running far at the speed mentioned. If you can attain a speed of thirty-five miles an hour with sidecar you are not doing at all badly. Under the circumstances we should recommend you to let well alone. Hill climbing is largely a question of good compression and moderate gear ratio.

## Fitting an Oversize Tyre.

**?** I should be glad of an answer to the following. I propose fitting a 28in.  $\times$  2 $\frac{1}{2}$ in. tyre on to the 28in.  $\times$  2 $\frac{1}{2}$ in. rim of my sidecar wheel. Is this advisable, or will it be more of a drag on the cycle? I have no doubt that it will be more comfortable for the passenger.—J.A.M.

If your rims are the standard D Section, approved by the Cycle and Motor Cycle Manufacturers' Union, you will be able to fit a 28in.  $\times$  2 $\frac{3}{4}$ in. or 28in.  $\times$  2 $\frac{1}{2}$ in. cover in place of the 28in.  $\times$  2 $\frac{1}{2}$ in. A very slight difference in the size of the tyre will make no appreciable difference in the running of the sidecar, nor will it take more power out of the engine to drive it. Where the heavier tyre scores is that it can be ridden more slackly inflated than one with a smaller section.

## Engine-shaft Clutch Adjustment.

**?** I should be obliged if you could enlighten me as to what is wrong with my 5-6 h.p. Rudge-Multi. The machine has been running fairly well until recently, when, after starting on the stand and the engine running strongly, on putting in the clutch the engine stopped dead. After repeated trials to get a start, I came to the conclusion the fault lay in the clutch, as when the engine stopped there was a kind of blow-back through the axle. I have taken out the clutch plates (which showed they had not been receiving sufficient lubrication), cleaned and well oiled them, and put the whole contrivance back, but with the same result as stated above, nor can I obtain free engine. I have some little mechanical knowledge, but I have not taken a clutch down previously. I replaced the clutch plates as follow: First, an "outer" plate and then an "inner" plate, and so on for the twenty-five pairs. I presume this is correct, and also that the plates could not be compressed "too much."—E.C.P.

Examine the lever between the clutch and the crank case by which the clutch is operated. There should be from  $\frac{1}{2}$ in. to  $\frac{3}{4}$ in. play in this lever. The holes in the axle through which oil enters to the clutch plates should be cleaned out, otherwise the clutch plates run dry. The coil springs which separate the plates for free engine position should be in good order. It is possible that through the clutch getting hot these springs have taken a permanent set, and, having lost their elasticity, they do not cause the plates to separate.



### A Lightweight Sidecar.

**?** I have a 2½ h.p. two-stroke Monopole, 1916 model, Albion two-speed, free engine, hand-controlled clutch. I wish to fix a very light sidecar, and I may say that this sidecar is only intended for a girl of eight years and not for adults. Do you think the machine is capable of this extra work?—C.M.

With a very light sidecar, and a passenger weighing not more than six or seven stone, the machine should prove capable of the work, but we do not as a rule recommend the use of a sidecar with such a low-powered machine. Still, if you keep up the engine speed by making liberal use of the low-gear, and select roads where the hills are not steep, it should give satisfactory service. Carrying a passenger on the carrier is rather different from sidecar work, as the latter presents a much larger area to wind resistance, and thus calls for increased power of propulsion.

### A Heavy Fuel Knock.

**?** I shall be glad of your advice upon the following matter. I have a 3½-4 h.p. single-gear cycle, Senspray carburetter. I have been running upon neat paraffin without any warming device of any kind. I get very good results except for one thing, and that is, a pronounced knock when starting. I start upon a carburetter full of petrol, and can continue quite well upon paraffin, but when I have occasion to stop and restart I get this bad knock, until a speed of about 8 m.p.h. is attained, when the trouble ceases, except upon stiff hills, when it will recommence in a less degree. The knock is so bad at times that I have trouble to get a start at all, and although the air is off and the spark slightly retarded, a series of back-fires occurs, as well as the knock. Tuning, etc., is correct, and on petrol only no such trouble is experienced. (1.) Will taking the petrol pipes round the cylinder tend to stop the trouble? (2.) Is there any other likely cause of such a bad knock being cured by any other adjustment? I have just cleaned deposit from the engine, ground the valves, and generally tuned the machine. When going well it seems to have more power than on petrol, but I am afraid this knocking will damage the bearings. (3.) Would magneto points being too close cause the trouble?—H.C.

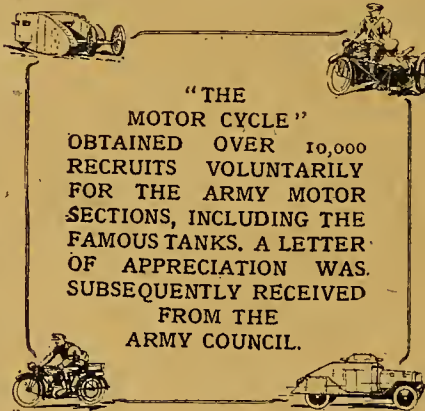
We presume from your letter that the knocking has become gradually worse, in spite of the fact that you have decarbonised the engine. If this be so, and taking it that you are using the same plug, etc., it would seem to indicate that the use of the paraffin has had a detrimental effect upon the engine bearings. You make no mention of having fitted a hot-air intake, without which excessive engine wear is almost certain to accrue from the use of paraffin. (1.) It is a good plan to take the petrol pipe round the cylinder, but this does not dispense with the necessity for a hot-air intake. (2.) We would recommend you to fit a thick packing joint between the cylinder and the crank case, thereby reducing

the compression of the engine, about 3 in. should be sufficient; but you may find that the compression can advantageously be reduced further than this. Another way in which the compression can be reduced is described on page 382, column 3, of our issue of June 28th. Try also a single point plug having heavy electrodes. A lower gear ratio would probably improve matters. (3.) No, the magneto points being too close together would not cause the symptoms you describe.

### Refund for Commercial Rider.

**?** Will you give me the legal ruling on the following? I use an 8 h.p. Enfield parcel car outfit in the course of my business. I receive my allowance of petrol—twelve gallons a month, duty free. I have made application for the return of the further half tax, which is returnable on motors used for trade purposes only. Our local inspector has refused my application on the grounds that the Act states "motor cars."—S.G.W.

A motor cycle is a motor car, unless otherwise stated, within the meaning of the Act; therefore, your local inspector cannot refuse your application on these grounds.



### Decarbonisation.

**?** In a recent issue you inferred that a 3½ h.p. Sunbeam with a Sunbeam sidecar should run 2,000 to 3,000 miles without requiring decarbonising. I use good oil and handle my machine most carefully, but can never run more than 800 miles (and sidecar is usually empty) before the engine requires cleaning. I oil liberally, but not excessively. The engine gets very hot even after a few miles run. Could you recommend an oil you have tried that may give better results than I am getting?—P.T.

Your machine should certainly do more than 800 miles without decarbonising. Evidently the excess of carbon deposit is due not to imperfect lubrication, but to overheating, owing to improper carburetter adjustment. You might try a smaller jet and run always with the ignition as far advanced as possible, except, of course, when running very slowly on top. These engines generally run very coolly, and it should not be necessary to decarbonise under 1,500 or 2,000 miles.

### Economising the Petrol Supply.

**?** I am riding a 1916 A.J.S. 4½ h.p. three-speed twin. I have a small supply of petrol, which I am afraid I cannot augment, and should like your advice as to how to make my supply spin out as far as possible. The machine is perfect in every way and is only ridden solo. I use a 25 jet on carburetter, and the engine will take full air when going—no matter the position of throttle lever. (1.) Could I with advantage use a smaller jet, and if so, what number of jet would you advise (I do not want speed—25 m.p.h. and good hill climbing would satisfy me)? (2.) Could I use 25% paraffin with 75% petrol without fitting a hot-air intake?—J.J.B.

(1.) You do not mention the make of your carburetter, but we presume it is an Amac, in which case it is doubtful whether you would improve your consumption by fitting a smaller jet. A 25 jet is on the small side, but this question can only be decided by experiment on the road. (2.) We should strongly advise you to fit a hot-air intake. You would then be able to use at least 25% paraffin in perfect safety, but without such a fitment you are taking risks in using any paraffin at all. Also petrol blown back from the carburetter would be utilised. Make sure there is no leakage from the tank filler cap or elsewhere, and do not fill the tank brim full. Also avoid flooding unless absolutely necessary in order to obtain a start.

### READER'S REPLY.

#### Magneto Lighting.

With reference to the question of "A.G.M." in your issue of June 14th. He could use three 3½ volt bulbs of about 1 c.p. each, or perhaps he might possibly be able to go to 1½ c.p., but the type of lamp he talks about is the usual 4 volt 4 c.p., which utterly rules these bulbs out of the question altogether. Secondly, it will not be impossible to recharge accumulators from the magneto when we have perfected an experiment upon which we are at present working. Every magneto maker will and must say that his magneto is for ignition only, but no harm will result to any good type of magneto in using it in conjunction with the F.R.S. outfit. Where a magneto is not fitted with a cut-out terminal the makers of the lighting outfit can supply one.—F.R.S. LAMPS.

### RECOMMENDED ROUTES.

#### LIVERPOOL TO YEovil.—E.J.B.

Liverpool, Birkenhead, Chester, Whitchurch, Hodnet, Wellington, Bridgnorth, Kidderminster, Worcester, Tewkesbury, Gloucester, Stroud, Nailsworth, Dunkirk, Bath, Beckington, Frome, Bruton, Sparkford, Yeovil. Approximately 200 miles.

#### COVENTRY TO EDINBURGH.—EAST COAST.

Coventry, Leicester, Newark, East Retford, Doncaster, Ferrybridge, Wetherby, Boroughbridge, Leeming, Scotch Corner, Darlington, Neville's Cross, Newcastle-on-Tyne, Morpeth, Alnwick, Berwick-on-Tweed, Dunbar, Edinburgh. Approximately 325 miles.





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Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd., and crossed** & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

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For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

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The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**A** BINGDON King Dick, late 1914 combination, 5-6 h.p., 3-speed, Gloria sidcar, excellent condition; £58.—Griffin, 89, Gt. Portland St., W.1. [4761]

**A** BINGDON, 3½ h.p., single-speed, adjustable pulley, Bosch mag., Pan seat saddle; £29/10; E.P., or exchange.—Service Co., 292, High Holborn, London. [5204]

**S**IDE CAR Outfit, 3½ h.p. Abingdon, 3-speed, splendid condition, lamps, speed indicator, perfect comfort, wind screen and hood; £45; trial after 7 p.m. by appointment; owner joined up.—Robbins, 12, Station Parade, Kew Gardens. [4855]

### A.J.S.

**A** J.S. Spares; prompt delivery.—Cyril Williams Chapel Ash Depot, Wolverhampton. [2305]

**A** J.S. Combination, 1914, 3-speed countershaft; £70; guaranteed.—Wauchope's, 9, Shoe Lane, London. [5033]

**A** J.S., 1915, 2½ h.p., 3-speed, clutch, T.T. bars, P. and H. head lamp, generator, rear lamp, tools, sound tyres, machine perfect throughout; £43/10.—Advertiser, 156, Gt. Portland St., W.1. [4205]

**A** J.S., 4 h.p., touring model, new July, 1915, not used since October, 3-speed, kick starter, handle-bar clutch, Lucas lamps, Low's patent generator, Stewart horn, tip-top condition throughout, engine runs beautifully; £60; with new Empire sidcar £74.—J. O. Philip, Sherston, Malmsbury, Wilts. [5184]

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## MOTOR CYCLES FOR SALE.

### A.J.S.

**A** J.S. 1914 6h.p. Combination, in splendid condition and order; £65.—Seal and Ball, Southport. [X2147]

**A** J.S. 1916½ 6h.p. Combination, Lucas electric lighting set, electric horn, hood, hood cover, screen, speedometer, mirror, spring seat-pillar, spares, spare wheel and tyre, beautiful condition, mileage 1,800; cost £150 last September, accept £125.—24, Tenthury Rd., King's Heath, Birmingham. [X2335]

### Alldays.

**1917** Alldays Allon, shop-soiled; £40.—Jones, Garage, Broadway, Muswell Hill. [5113]

**C**OLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [X0796]

**A**LLDAYS Matchless, 2½ h.p., 3-speed, 1914; £25.—H. J. Marston, 50, Argyle St., Birkenhead. [2123]

**1916** Alldays Allon, 2½ h.p., 2-speed; £35, near offer.—Broom, 77, Marylebone Lane, Oxford St., W. [4993]

**A**LLDAYS Allon, 2-speed, £35; Alldays Allon, £32/10; E.P., or exchange.—Service Co., 292, High Holborn, London. [5205]

**NEW 1917** Allons, 2½ h.p., 2-stroke models; £42; 2% only added for extended payments.—Wauchope's, 9, Shoe Lane, London. [5034]

**R**IDER TROWARD and Co., 31 and 78, High St., Hampstead.—Allon, 1916, 2-speed, 2-stroke, 29 gns.; 1915 ditto, Binks, 27 gns. [5111]

**A**LLDAYS Allon, single speed, £36; 2-speed, £42; 2-speed and hand clutch, £45; new; E.P. no extra, or exchange.—Service Co., 292, High Holborn, London. [5186]

**A**LLON 2½ h.p. 2-stroke Motor Cycle, £38/14, or on extended payments terms, deposit £7/14, and 12 monthly payments of £2/13; 2-speed and other models also supplied.—Harrods Stores, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [5148]

### Ariel.

**A**RIEL, 3½ h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562]

**C**OLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797]

**A**RIEL, 3½ h.p., 2-speed, free engine, and sidcar, lamp, horn, fine condition; £23.—9, Hanbury St., E.1. [4987]

**1917** Ariels in stock; immediate deliveries; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill. [5114]

**1914** 3½ h.p. Ariel, 3-speed hub, in excellent condition; price £37/10.—Apply, J. Noble, jun., Howgate, Milton Bridge, Midlothian. [X2304]

**A**RIEL Latest 1917 3½ h.p. Combination actually in stock; £93/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [4966]

**1917** New Ariels from stock, £72; 3-speed countershaft gear, clutch, and kick start; gradual payments, 2% extra.—Wauchope's, 9, Shoe Lane, London. [5031]

### Auto-Wheels.

**A**UTO-WHEEL, 1914 model, perfect mechanical condition, good tyre; bargain, £7/10.—Advertiser, 156, Gt. Portland St., W. [5181]

**A**UTO-WHEEL, 1916 B.S.A. Model, shock absorber, excellent condition, not used 500 miles, 10 gns.; another, ordinary model, excellent condition, 8 gns.; two Raleigh cycles for same, 24in. and 26in. frames, £4/10 each.—21, Station Rd., Forest Gate, London, E. [4885]



# THE MOTORCYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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## Loading Up the Handle-bars.

**H**ANDLE-BARS are primarily for steering, and though that significant fact is not lost sight of, very often the bars of a motor cycle are called upon to answer much the same purpose as the dashboard of a car—a space provided by nature for the mounting of numerous fitments and accessories. During the last few years we have seen one control after another transferred from the tank or elsewhere to the bars, and though the principle of full handle-bar control is to be commended, a point is reached when its advantages are all but outweighed by its disadvantages. It is known to every practical rider that the faintest drag in the steering is detrimental to the control, and though there was a period when we ourselves took a pride in the show our handle-bars presented, experience has taught us better.

Let us consider the fitments to be found on the helm of the ordinary touring mount of to-day: (1) Speedometer; (2) horn or mechanical hooter; (3) clutch control; (4) front wheel brake lever; (5) exhaust valve lifter; (6) carburetter controls; (7) magneto control and sometimes a route card—a truly formidable array, which would tip the beam at a higher point than one might imagine. Not only is the weight of all these accessories detrimental to the steering, but each—with the exception of the horn and route card—has its connecting cable, which offers a certain resistance.

Many riders object to a complication of handle-bar controls, and, besides becoming unwieldy, such a layout of goods is extremely susceptible to damage, while the handle-bars offer scant anchorage for their attachment, with the result that the accessories mounted thereupon require constant tightening. Now that we have added the clutch to the already swollen list, there is no doubt that the system requires some modification, and it would appear that the matter rests more with the makers of accessories than with the designers of machines. We

do not propose to enter here upon the advantage or otherwise of the single lever carburetter, etc. A more useful purpose might be served by urging the manufacturers of speedometers, mechanical alarms, and so forth, to design their goods so that they do not depend upon the bars for their accessibility. We are, of course, aware that speedometers driven off the rear wheel, and also many mechanical horns, are designed to be mounted on the top tube.

Certain controls must occupy the bars, and while these should be kept as simple as possible, other fitments which can just as conveniently rest elsewhere might profitably be arranged to do so.

A general reduction in handle-bar gear would be an advantage in all respects.

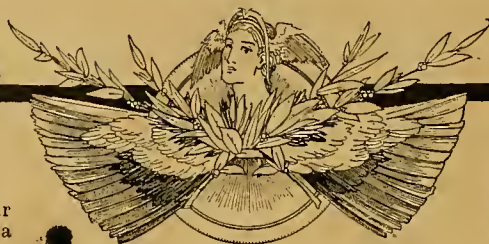
## Motor Cycle Mechanics—the Why and Wherefore.

**W**E commence in this issue a series of articles which will treat in a scientific manner, but without becoming too deeply technical, of some of the many problems which crop up from time to time in our columns. There are many misconceptions common among motor cyclists, which we hope these articles will do something to dissipate, and many little points which would be all the better for a little elucidation. For instance, all our readers know by this time (at least we hope so) that when turning a corner it is the inside wheel, or wheels, which tend to lift, but, if asked to explain the reason for this, many would be entirely at a loss.

This is but one of many problems in which a little scientific knowledge is desirable. We hope, therefore, that none of our readers will pass by the articles under the mistaken impression that they are dry, for we can assure them that such is not the case. They are educative as well as interesting. Further instalments will appear from time to time, though not necessarily in consecutive issues.



# IDEAS: Useful and Ingenious.



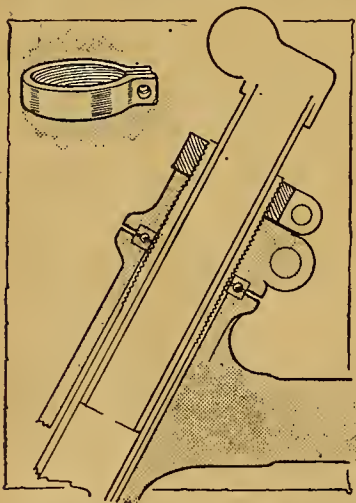
## CORKS ARE USEFUL!

**I**F a machine be fitted out with sidecar lugs which are not in use, it is a good plan to place corks in these to exclude dirt and moisture, and thus prevent rust. Similarly the open end of the saddle-pillar or any other tube can be stopped up in the same way, and for the same reason; and, moreover, a cork placed in the bottom of the head will help to preserve the front mudguard from damage if the fork springs give too much movement when passing over unusually rough roads.

Another use for bits of cork (or in this case pieces of rubber may be more suitable) is to prevent rattle between two parts which just touch or nearly do so. In all cases a little enamel to match the colour of the machine gives a neat finish.—AURIGA.

## STEERING HEAD ADJUSTMENT.

**H**AVING had a lot of trouble with the head of my machine—a 4 h.p.—working loose I got over the trouble by taking off the old nut on the fork stem and making one like the sketch. This I screwed to fit the fork

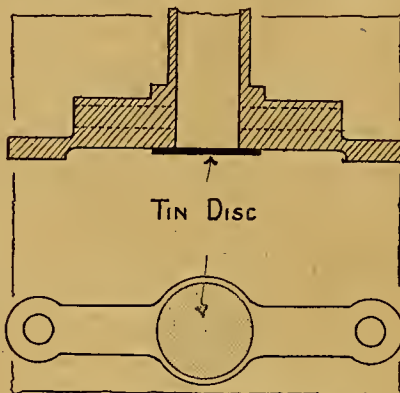


A screw clamp to prevent the steering head working loose. This takes the place of the standard nut on the fork stem.

stem, so that when once put on and tightened up by the screw in the lug on the side the threads clamp into one another. I have found this very satisfactory. I should have thought the makers would have done something of this sort to prevent the risk of the rims of the lugs holding the ball races breaking off with a very loose head.—A. E. BRADLEY, London, S.E.1.

## TO STOP DUST ENTERING STEERING COLUMN.

**A** TIP to prevent dust, etc., entering at the uncovered hole on the underside of steering column is to solder a tin disc over this hole. The solder should be run over the whole surface of the tin and the portion of crosspiece

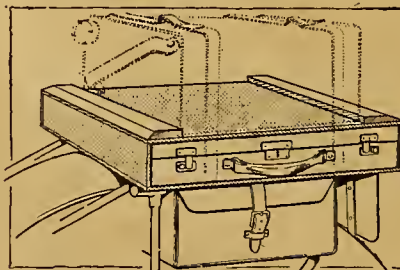


A tip for preventing dust entering the uncovered hole underneath steering column.

which has been cleaned to prevent rust. Wear of the shackle bolt passing through the crosspiece is thus prevented. This is quite worth the trouble, and can be done in a very short time by anyone able to use a soldering iron.—DOUGLAS BARTLETT, Sec.-Lt.

## CARRYING A LEATHER CASE.

**T**HE ordinary carrier has many knobs and lugs, which play havoc with any attaché case or bag, no matter how securely attached. In the course of a run of 100 miles my leather travelling case was cut through in two places by vibra-

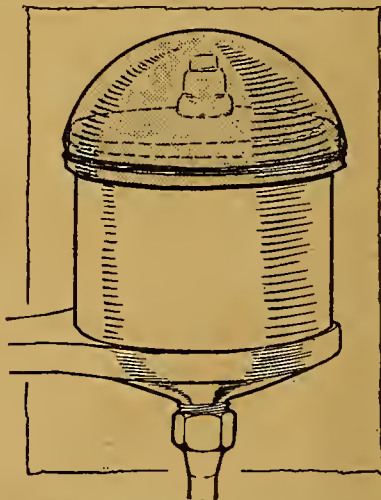


A felt-lined wooden carrying case for an attaché bag.

tion. A simple wooden box has been made from 3/4 in. stuff. One side is open and the whole is lined with felt. Into this the leather case slides tightly. Allowance must be made when measuring for the additional thickness of the felt. Two chamfered battens on the top side, set the length of a petrol can apart, are very useful when carrying a spare tin. The whole requires only two straps to secure tightly and does not damage the leather case. The finished article is stained dark brown. It was purposely not secured to the carrier, as it is only required occasionally; but the idea might be developed by fixing the box to the carrier with four metal straps and screws on the underside. A small hinged plate with locking arrangement could be fitted to hold the leather case in position, and straps permanently fixed to the top to hold the petrol can separately, but the simple arrangement illustrated is sufficient for ordinary purposes.—CHARCOAL (Bristol).

## RAIN ENTERING FLOAT CHAMBER.

**A**FTER a long ride in the rain one frequently experiences intermittent firing due to a drop of water settling at the bottom of the float chamber. To prevent this happening obtain an ordinary rubber ball and cut



A cover to prevent water entering the float chamber.

in half and wire over the top of the float chamber. The carburettor can still be flooded, yet the ingress of water through the "tickler" is prevented. This idea was adopted by T.T. riders to prevent the float chamber cover unscrewing with vibration; generally a piece of cycle inner tubing was used.—X.Y.Z.





### The Meddler-proof Mount.

MY own riding dates back to the days when every motor was at the mercy of any meddler, for the simple reason that we used accumulator ignition. If the engine chanced to stop with the platina in contact the accumulator automatically ran down if any loafer turned on the switch. So every manufacturer provided an owner's safety device: either the handle of the switch was detachable or else a special interrupter plug was fitted in a block at some other point of the circuit. The safety device always went into our vest pockets before we said good-night to the car or cycle. The times are just about ripe for a similar safety device in respect of lighting dynamos and gears. An interrupter plug or detachable switch key would solve the former problem, and it would not cost designers more than a few pence per mount to solve the latter. All it needs is a padlock fixing the gear lever in neutral by means of a drilled plate on the gate and a hole in the lever. Makers already realise the conditions, as they usually pack the lever in neutral with pieces of wood when they send a machine by rail. They should go further, and fit some permanent safety lock, which will always be at the owner's disposal.

### The Perfect Handle-bar.

IT is rather curious that the trade is so unanimous on the proper design of handle-bar. Look at any catalogue or any standard touring machine, and you will see a long bar, narrow across the grips, and upswept backwards. It always reminds me of a child pushing a mowing machine intended for an adult. It affords the minimum of control, induces a frightful slouch in the vertebræ, and adds nothing to comfort, since the metal is far too rigid to absorb vibration. The really workmanlike bar is of short backward reach, very wide across the grips, to give the maximum of lateral leverage in all steering imbroglios, especially for speed work and on grease, and it is fairly well dropped. How far it should be dropped depends on the rider's tastes, with a single limitation—the grips must not be so low that they can puncture the tank if the rider has a tumble. My own bars sometimes inspire the question, "Don't they make your wrists ache on a long run?" It is true that dropped grips, or even horizontal grips, take a good deal of the weight when the rider is sitting well down to his work. But I never had a wrist ache yet, save on one occasion when, reporting a trial, I rode 180 miles in the day at high speed over rough greasy roads, whereas fifty miles with the standard bar is guaranteed to give anybody a severe backache. Furthermore, the dropped grips make it easy to keep a straight back, should one wish to do, and as they throw some more of the weight on to the front wheel, they are almost an infallible preventive of the worst kind of side-slip there is—front wheel side-slip.

### The Rotaries.

HONESTLY I have played my part in winning the great war. Little did I think when years ago my frivolous chatter coaxed respectable youth by the thousand into the grimed and oil-stained army of motor cyclists that these same boys would thereby develop a mechanical bent destined to serve a war-like-purpose in Armageddon. Last week I saw a service instructor initiating a class of novices into the mystery of the Monosoupape. The instructor himself first learnt what a cam is from our pages, and the same was true of a large percentage of his pupils. But he had not imbibed our well of English undefiled. "This 'ere engine is suitable for use on either pusher or tractor machines. Wot's the difference between a pusher and a tractor, my lad? Well, when you crash on a pusher you get the crankshaft in your backbone: but with a tractor you get it in your stomach." But, bless you, they have faced death so often in hill-climbs and on the track that they don't mind that. I have just bidden goodbye to a motor cyclist-pilot of nineteen summers or so: "Good-bye, old man: look for me in the casualty list under heading 'Died of Fright.'"

### Footrests and Cornering at Speed.

THE critics who denounce spring frame machines which seem likely to foul the ground with their footrests or footboards whilst cornering at speed miss two points germane to such a discussion. The first is that since the demise of the old high frames there has hardly been a machine with which a long-legged rider would not foul his footrests in lying over round corners at speed, unless he was prepared to shunt his saddle so far back as to spoil the balance of weight. The ordinary standard wheelbase, especially in the  $3\frac{1}{2}$  h.p. class, suffers from this fault most perceptibly. A tall rider must either drop his footrests and hit the ground at moments when a jar is most dangerous, or shove his rests right forward and ride with his legs extended at a most uncomfortable angle, or put his saddle so far back that the balance is upset and carrier space trespassed upon. There is not the least reason why a sensible spring frame should be worse in this respect than existing rigid frames, few of which are perfect for riders exceeding 5ft. 9in. The second point is that the sort of rider who wants a spring frame is usually of a timid character, and does not lie over enough or take his corners fast enough to hit the ground, provided his footrest tips have a 6in. ground clearance, which is easily granted by any maker. The best solution for a tall rider is to employ foot supports which give several alternative foot positions; on standard wheelbases, especially in the  $3\frac{1}{2}$  h.p. class, it is impossible to provide him with a single satisfactory position for his feet. Only long distance riders are qualified to give verdicts on this point.



## COOLING THE ENGINE INTERNALLY.

### A Scheme to Induce all the Air for the Carburettor *via* the Crank Case. The Advantages offered by such a Scheme.

**W**HEN one comes to analyse the troubles experienced with motor cycles, few though they may be, it will be found that ninety per cent. of them are due to excessive heating of the engine. All the present talk about the use of aluminium alloys in air-cooled engine practice is with the one object of reducing to a considerable extent the working temperature of the engine, and so improving the conditions for the moving parts. Novices know that excessive heating of an engine causes knocking. Again, it rapidly results in the faces of the valves, as well as their seatings, becoming pitted to such an extent that compression escapes. Sparking plugs, too, have a much shorter life in engines developing excessive heat than in cool-running motors. Lesser known troubles, but which occur none the less, due directly to overheating, are the warping of cylinder and piston.

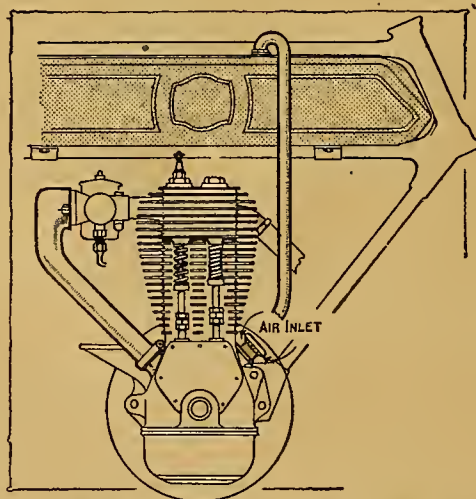
#### Cool the Engine Interior.

Now it has been suggested in these columns on previous occasions that the subject of internal cooling of engines has not received the attention that such an important problem warrants. If we could keep the internal parts of an engine at a comparatively low temperature, we should effect an immense saving in the consumption of lubricating oil, as it would maintain its viscosity for a much longer period, and would therefore prove a more efficient lubricant. This would be all to the benefit of the working parts. Seizing of the piston in the cylinder is a trouble occasionally experienced on the road, but particularly at Brooklands and in T.T. races, when prolonged speed bursts are the rule. This sort of thing, however, seldom occurs with a water-cooled engine, as it is much easier to maintain a film of oil between the piston and cylinder in the case of an engine running at a comparatively low temperature. How to maintain a low temperature in an engine without the complication of water-cooling is the problem which presents itself. Aluminium, as already indicated, offers immense possibilities, but there is still another promising channel which has

not been considered in detail in connection with motor cycles, and that is the desirability of drawing cool air through the crank case on its way to the carburettor. By this means—and the writer sees no great difficulties connected with the scheme—a supply of cool air could be induced into the crank case during every cycle of operations, and so assist in cooling the oil, and also the big end and other working parts of the engine. Such a system is shown in the accompanying design, the B.S.A. and Senspray type carburetters lending themselves splendidly to the arrangement under discussion. for the *whole* of the air supply could first pass through the crank case. Besides cooling the oil and the big end, many other advantages would accrue from connecting the carburettor air inlet to the crank case and providing a second air inlet on the opposite side.

#### Advantages Offered.

1. The cool rush of air is beneficial in various ways, as already mentioned.
2. The heat of the interior of the crank case would have a useful effect in warming the air on its way to the carburettor, and so assisting considerably the vaporisation of heavy spirits which are the rule nowadays.
3. A certain amount of oil fog would be drawn into the engine, which is not without its use.
4. The descending piston, during the suction stroke, acts to some extent as a pump, and assists in forcing a full charge into the engine.
5. Though the formation of carbon on the piston and cylinder head is mainly due to burnt oil, a certain amount has been proved to be foreign matter introduced *via* the carburettor. The fact that carbonaceous matter does not form on the piston and cylinder of water-cooled engines nearly so readily as on air-cooled engines indicates that we have much to make good before we approach the perfection of car engine design.



A design in which cool air is drawn through the crank case. After becoming warmed and impregnated with oil fog it is induced *via* the carburettor to the engine.

#### Objections and Means of Overcoming Them.

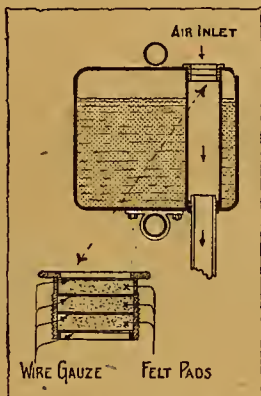
Now to turn to the other side of the picture. The out-



**Cooling the Engine Internally.—**

standing objection to drawing air through the crank case would be the possibility of introducing a certain amount of grit and dust, which would have a very deleterious effect upon the bearings, and might possibly score the cylinder; consequently it is imperative to design some arrangement which shall preclude all possibility of foreign matter entering the crank case. A special cylinder might be arranged with fine gauzes, though the writer is satisfied that even fine gauzes are not effectual in preventing the ingress of dust. A better system would be to draw all the air we require through water carried in a tank with a vertical baffle in the centre; this would ensure proper filtration of the air. Still another scheme suggested by the writer is shown in the smaller sketch accompanying these notes. It consists of a pipe from the crank case attached to the underside of the tank. Above is a chimney formed in the tank, and through this air is drawn *via* a dummy filler cap provided with three thicknesses of felt, or glass wool, possibly moistened.

Such a high position is purposely selected in order to get away from the dust whirls which are usually



An alternative method. In this case air on its way to the crank case is drawn through a chimney formed in the tank. Felt pads are arranged as filters in the top.

more pronounced in the region of the engine than on the top of the tank. The larger sketch, reproduced on the previous page, shows part of another idea, which is to attach a pipe of sufficient diameter to ensure an adequate air supply to the top of the petrol tank, and to draw off the petrol vapour. This moist air would give a better cooling effect than pure air, but against this one must remember the possibility of the oil being thinned and also the likelihood—though in a very distant degree—of an internal explosion due to the accumulation of gas. Again, ball valves might be necessary. The system first mentioned—to bring air through felt pads and a chimney formed in the tank—is, therefore, to be preferred.

The writer would be pleased to see comments on the idea put forward. It may be added that the type of engine shown is one having the cylinder and top half of the crank case cast in aluminium alloy in a single piece and shrunk on to a thin cast iron liner. The lower half of the crank case is, of course, of aluminium, and the possibility of readily removing it is a great advantage, as it at once exposes the big end bearing, the wear of which could be readily taken up in case of need.

G.S.

## POINTS FOR BUYERS.

### Details to Observe in Purchasing Second-hand Machines.

**A**T the present day a prospective buyer is, or ought to be, well instructed concerning the pitfalls that await people who take second-hand machines on trust. Such points as play in bearings, defective compression; and the like are dealt with in detail in the handbooks; moreover, many articles containing much useful advice have already appeared in the pages of *The Motor Cycle*. The few points I enumerate are meant to appeal to the more discerning buyer, since they are not readily brought to mind except when one's fate is to endure them.

1. Does the magneto chain receive the benefit of the oil that oozes from the main crankshaft bearings, presuming there is no more positive means of supplying it with oil?

2. Will the magneto chain case come apart without the necessity of removing such important parts as outside flywheels, clutch, and brake pedals?

3. Are the bolts that permit the magneto to slide along its supporting platform-accessible and able to be loosened with only one spanner? Magneto chains can become loose, and to lie on one's back holding the head of the bolt firm with one spanner and slackening off the nut with another is not conducive to amiability.

4. Is the gear control quadrant so arranged that the change from middle to low, and the consequent declutching, is the longest of all? One seldom changes from middle to low except when the momentum of the machine is least, *i.e.*, on hills, and it is then necessary to perform the operation as quickly as possible.

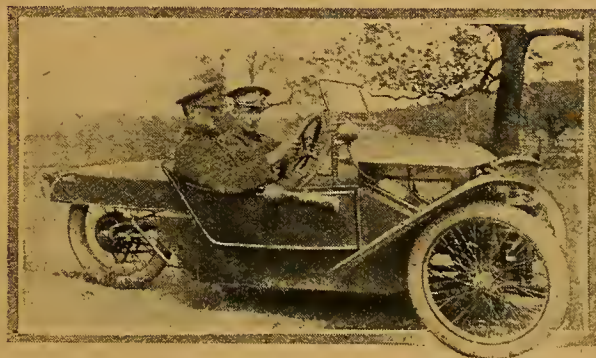
5. Are the brake and exhaust lifting levers so low in their normal position that they foul the top tube some time before the front wheel can get into the right angle position? This not uncommon defect hampers steering in no small degree.

6. Has the back brake to be removed before the rear wheel can come out?

7. Can every jolt subject one to the indignity of a stand trailing in the road?

8. Are such undesirable objects as hot exhaust pipes and unguarded plug terminals reasonably unlikely to come into contact with the rider's person?

PROGRESSIVE.



Cpl. A. Mariani, who is seen at the wheel of an 8 h.p. Morgan, was an exponent of the Indian motor cycle before joining up, and is now a Clyno instructor in the M.M.G.S.

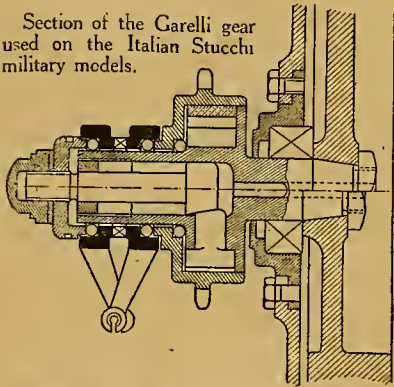


## THREE ITALIAN MILITARY MODELS.

Italian Designers follow British Practice.

A FIRST glance at the accompanying illustrations conveys the impression that the machines shown conform to general British practice, but on examining them more closely it will be seen that the detail design is in many respects foreign to our ideas. The machines shown are made in Italy for the Italian Government, and bear the name of Stucchi. Three Stucchi models are shown—the  $3\frac{1}{2}$  h.p. single and 6-8 h.p. twin, both having chain-cum-belt drive, and a 6-8 h.p. twin, designed for sidecar use and having all-chain drive. All machines are fitted with a three-speed gear box complete with kick starter, and one of the most interesting points in their mechanism is the metal-to-metal engine shaft clutch, controlled from the handle-bars by Bowden wire, and specially designed by Signor Garelli.

Section of the Garelli gear used on the Italian Stucchi military models.



Referring to the illustration, it will be seen that the clutch consists of a simple expanding metal ring contained in the engine shaft sprocket, operated by a pair of cam-faced levers mounted on ball bearings on the engine shaft boss. The clutch would appear to be of limited diameter, though its width is ample, and it must, of course, be borne in mind that, since it runs at full engine speed, nothing like the same friction areas are

required as in the case of a geared-down clutch.

We are informed by our Italian correspondent that this clutch has been

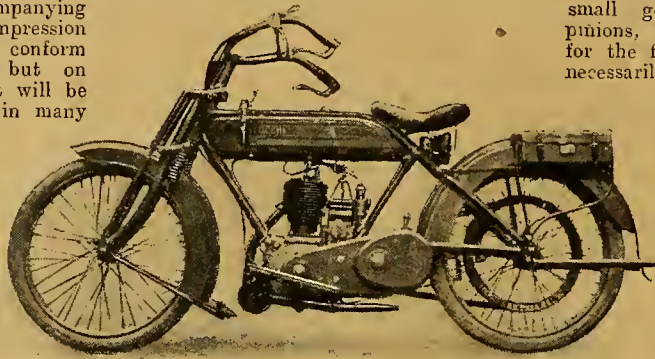
adopted by the Italian Army, and that during trials it was found possible to effect a standing start on a sharp gradient with a  $3\frac{1}{2}$  h.p. sidecar outfit carrying three persons, and further, that the Moser people (Switzerland) have adopted this clutch for all their motor cycle engines. Our own experience of high speed, small diameter, expanding ring clutches has not been of the brightest order, however.

One apparent defect which arises from this type of clutch is the very slight reduction in gear ratio between the engine and the gear box. A large engine shaft sprocket is, of course, necessary, and therefore the chief reduction must be made between the gear box and the back wheel. This means a

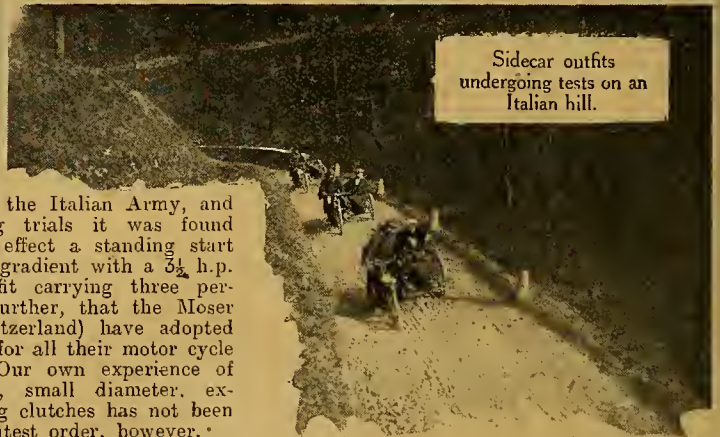
small gear box pulley, high speed pinions, and reduced ground clearance for the final chain drive, owing to the necessarily large size of the belt rim.

In the sidecar machine both brakes operate on the rear wheel, one on the rim, while the other is of the internal expanding type. The chain cases appear to be good, though they lack inspection ports. The valve lifting mechanism is somewhat complicated, consisting of a long-armed bell crank lever, which actuates a smaller lever communicating with the interior of the timing case.

It will be observed that an ordinary sight drip with plunger pump is fitted for lubrication, while the control throughout is on standard lines. The tool cases are of sensible dimensions and fitted in the

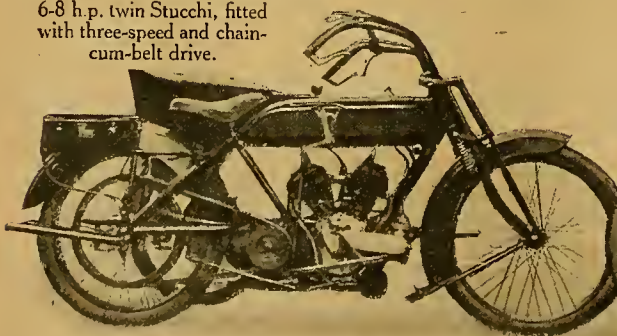


An Italian made military motor cycle, the Stucchi, built specially for the Italian Army.

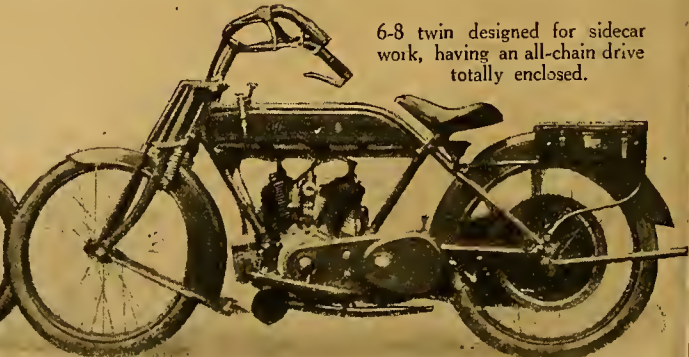


usual position on the carrier, though the curved carrier tube is not a very commendable feature. It will be observed also that Amac carburettors of standard type and Dixie magnetos complete what is, upon the whole, an attractive specification.

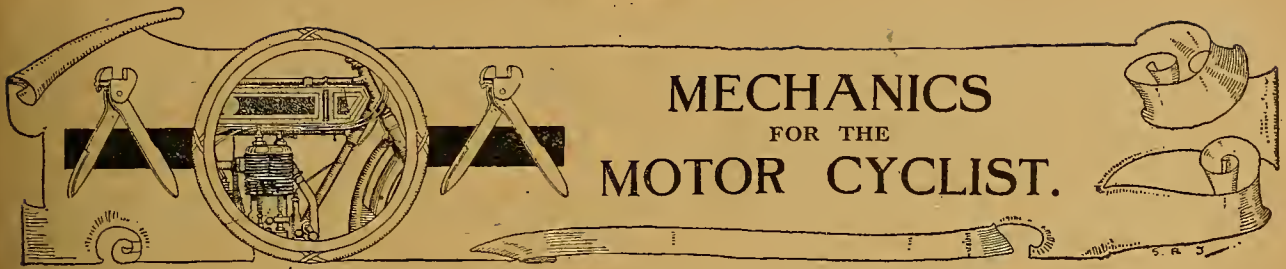
6-8 h.p. twin Stucchi, fitted with three-speed and chain-cum-belt drive.



6-8 twin designed for sidecar work, having an all-chain drive totally enclosed.







## First Instalment: SPEED AND ACCELERATION.

It is hardly necessary to point out to thinking motor cyclists the great desirability of a little mathematical knowledge—so many questions may crop up, as, for instance, the horse power required to mount a certain hill, the tension of a belt or chain when driving a heavy machine, or the calculation of a gear, that the man who is entirely ignorant of these matters must often be at a loss. In this and the following articles (of which there will be several) the author proposes to discuss some of the simpler problems dealing with speed, acceleration, force, inertia, centrifugal force, etc., and their practical application to everyday questions in a popular manner without unnecessary technicalities. No motor cyclist, therefore, need pass by these articles under the impression that they are beyond his understanding, for everything is explained in simple language.

I HAVE never been able to suppress a faint feeling of astonishment at the rapidity with which motor cyclists become versed in all the technical mysteries of their pastime (or business, as the case might be). There would be no cause for surprise if riders were recruited exclusively from the ranks of trained mechanics; but as the vast majority of them begin their initiation unhampered by any mechanical knowledge beyond that acquired, say, during the erection of a rabbit hutch for little Teddy, one cannot reasonably withhold a tribute of admiration to their adaptability. Now, while some motor cyclists have no ambition to progress very far beyond the "veriest tyro" stage, being content with the moderate degree of technical knowledge that will enable them to handle their mounts with passable skill and economy, others incline to the theoretical aspect of the sport, and become argumentative on topics such as balancing, long and short stroke engines, cam design, and so forth.

### "Miscalling Technicalities."

This disputatious class of rider is rather inclined to overlook the fact that, although an utter ignorance of Newton's laws of motion is no hindrance to becoming a highly qualified road rider, or even a T.T. winner, some acquaintance with the science of mechanics is essential to those who involve themselves in discussions of the more abstruse scientific problems connected with the motor cycle. The correspondence columns of motor cycling periodicals offer abundant proof that the proverbial little learning in these matters frequently becomes a dangerous thing. One finds such terms as work, energy, and power used as though they were practically interchangeable by writers who would be deeply offended were their ability to distinguish between a timing pinion and a carburetter float called in question. As a result of this looseness of terminology, and the unfamiliarity with elementary scientific facts of which it is the evidence, the interesting and instructive debates that arise in these columns not seldom degenerate into heated, but entirely inconclusive, interchanges of personalities.

### The Necessity of Sound Principles.

Nor is it only riders of motor cycles who would profit by an insight into the mechanical principles which underlie the operation of these machines. The average

motor cycle has not by any means shed all the objectionable unmechanical features it inherited from its humble progenitor, the bicycle; nor will it until its design is governed more strictly by the laws of mechanics. The result of the application of these rules is seen in machines such as the Scott, the Douglas, and the A.B.C., whose distinctiveness is a proof not at all of the contrariety of their designers, but of their grasp of the principles of engineering science.

If any further excuse be needed for my somewhat presumptuous attempt to make good the deficiency to which I have alluded, it is this: there are so many puzzling phenomena with which the motor cyclist is familiar that admit of no satisfactory and universally-accepted explanation—"two-stroke rattle," for instance—that there is all the more reason for leaving no ambiguity on definite points of fact which admit of no difference of opinion.

### Scientific Terms.

These articles are intended, then, for the benefit of readers who are sufficiently interested in the mechanics of motor cycling to wish to add to their knowledge of the subject, but not sufficiently so as to go to the trouble of plodding through text books. Such readers have hitherto had to rely on such scraps of information as are occasionally tendered in these columns by learned debaters who turn aside from their task of demolishing their opponents to explain some minor point in language adapted to the comprehension of the multitude. These favours, however, are usually bestowed with such an ostentatious air of condescension that the multitude can hardly be expected to relish them or to profit by them. Since no great mathematical attainments are assumed on the part of those who read the following remarks, it will not always be consistent with brevity and clearness to adhere strictly to scientific proofs and nomenclature, and I therefore think it well to ask in advance the indulgence of any keen-eyed critics who may think I have sinned in this respect. If, for example, they object to the use of "speed" and "velocity" as though they were synonymous, I beg them to believe that I am fully aware of the difference in the meaning of the terms, and to concede that no confusion can result from ignoring the distinction at times.



### Mechanics for the Motor Cyclist.—

The mechanical problems with which we shall be concerned involve primarily the measurement of distance, weight, and time. More complex quantities, such as speed, acceleration, pressure, and even volts and amperes, can be expressed in terms of these fundamental units. Thus, *speed* may be defined as rate of change of position, or distance travelled in unit time, which implies that measurements must be taken both of time and distance—a fact of which the victim of police traps is only too well aware! The speedometer relieves the rider from the necessity of actually dividing a certain number of yards or miles by a certain number of minutes or hours, but only because the calculations had already been performed during the calibration of the instrument.

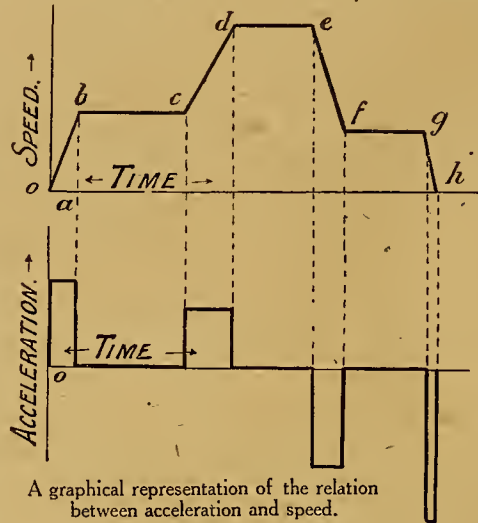
Just as speed is rate of change of position, so *acceleration* is defined as rate of change of *speed*. If, at a given instant, an object has a speed of 10 feet per second, and after a lapse of three seconds its speed has increased to 25 feet per second, its *change* of speed in three seconds is 15 feet per second, and its change of speed in one second, *i.e.*, its acceleration, is  $\frac{15}{3} = 5$  feet per second. Since acceleration is  $\frac{\text{speed}}{\text{time}}$ , and speed is itself  $\frac{\text{distance}}{\text{time}}$ , we see that acceleration can be represented by  $\frac{\text{distance}}{(\text{time})^2}$ .

The most familiar example of accelerated motion is furnished by the falling of bodies under the effect of gravity. During each second of its fall a body increases its velocity to the extent of 32 feet per second, that is, its acceleration is said to be 32 feet per second *per second*. It will be seen that the popular conception of acceleration agrees exactly with the ideas here presented. If a particular make of motor cycle is credited with possessing unusual powers of acceleration, we understand that it will attain a given speed in a much shorter time after starting from rest than will some other make.

#### A Graphical Example.

It is important to observe that high speed does not necessarily imply high acceleration—an object may be travelling at a very high speed and yet have no acceleration, while it may be at rest and momentarily

have considerable acceleration. It is only *change* of speed, and not the absolute value of the speed, that determines acceleration. The accompanying diagram gives a graphical representation of the relation between acceleration and speed in the case of the motion of a motor cycle. In this diagram speed and acceleration are plotted vertically, time being plotted horizontally. Glancing first at the upper curve, we will



A graphical representation of the relation between acceleration and speed.

suppose that the point *a* corresponds to the start of a short trip. The rising portion *ab* indicates the accelerated motion with which the machine starts from rest; we may suppose that during the period of uniform speed *bc* the rider is proceeding sedately through the streets of a town; at *c* the country is reached, and the throttle is opened more generously, as shown by the rising curve *cd*. A prolonged speed burst *de* follows, until a long ascent causes the speed to fall rapidly (*ef*). The line *fg* corresponds to the climb at moderate speed up the hill, while *h* represents the point at which the equipage comes to rest, in order that the engine, the driver, and his

passenger may cool themselves in their appropriate fashions. Turning now to the acceleration curve, we see that all periods of *uniform* speed correspond with periods of *zero* acceleration. When the speed curve slopes upwards, a positive acceleration is registered, while a downward slope of the speed curve coincides with a period of negative acceleration, or deceleration.

Of course, an actual record of a motor cycle trip on these lines would not present the stiff and formal appearance of the diagram we have just considered; changes of speed and acceleration are constantly occurring, with the result that the respective curves would present a very sinuous character. It would be an easy and instructive experiment to construct at least an actual speed curve. Provided a passenger with the necessary enthusiasm could be found, all that is needed is for him to book down speedometer readings at intervals of, say, fifteen seconds. The more frequent the readings, the more interesting will the resulting curve become. It should be quite feasible to construct an instrument that would actually draw such curves—it would consist of a special type of speedometer equipped with a needle which would record the speed on a moving band of paper. One would imagine that the use of sealed recording speedometers of this kind would materially reduce the labours of observers and timekeepers during prolonged road trials.

MOHANDIS.

### WHEELS OF AGRICULTURAL MOTORS.

In view of the importance of increasing the national food supply in the present emergency, Lord Rhondda has decided to modify the Order which penalises certain agricultural motors which do not exactly comply with the regulations respecting the size of cross-

bars of their driving wheels. The new regulation is restricted to vehicles which do not exceed five tons, and also, it is to be observed, there is a justifiable clause stating that it will only have effect during the continuance of the present war.



# AN EXCELLENT HOME-MADE MACHINE.

Special Leg Shields, Electric Lights and Fittings.

SOME very interesting departures are embodied in the machine illustrated herewith. Some of these, we feel sure, will interest many of our readers with a view to adoption.

The outstanding feature about the machine is the novel way in which two tanks have been fitted at the top of the leg guards. One of these tanks is used for paraffin, or substitute, while the other one provides a watertight and very substantial compartment for tools. At first sight it would seem that these rather heavy weights at the top of the leg guards would cause the latter to rattle, but this is not the case, as we proved to our own satisfaction by a fairly long run on the machine on very third-rate roads.

## The Lighting Arrangement.

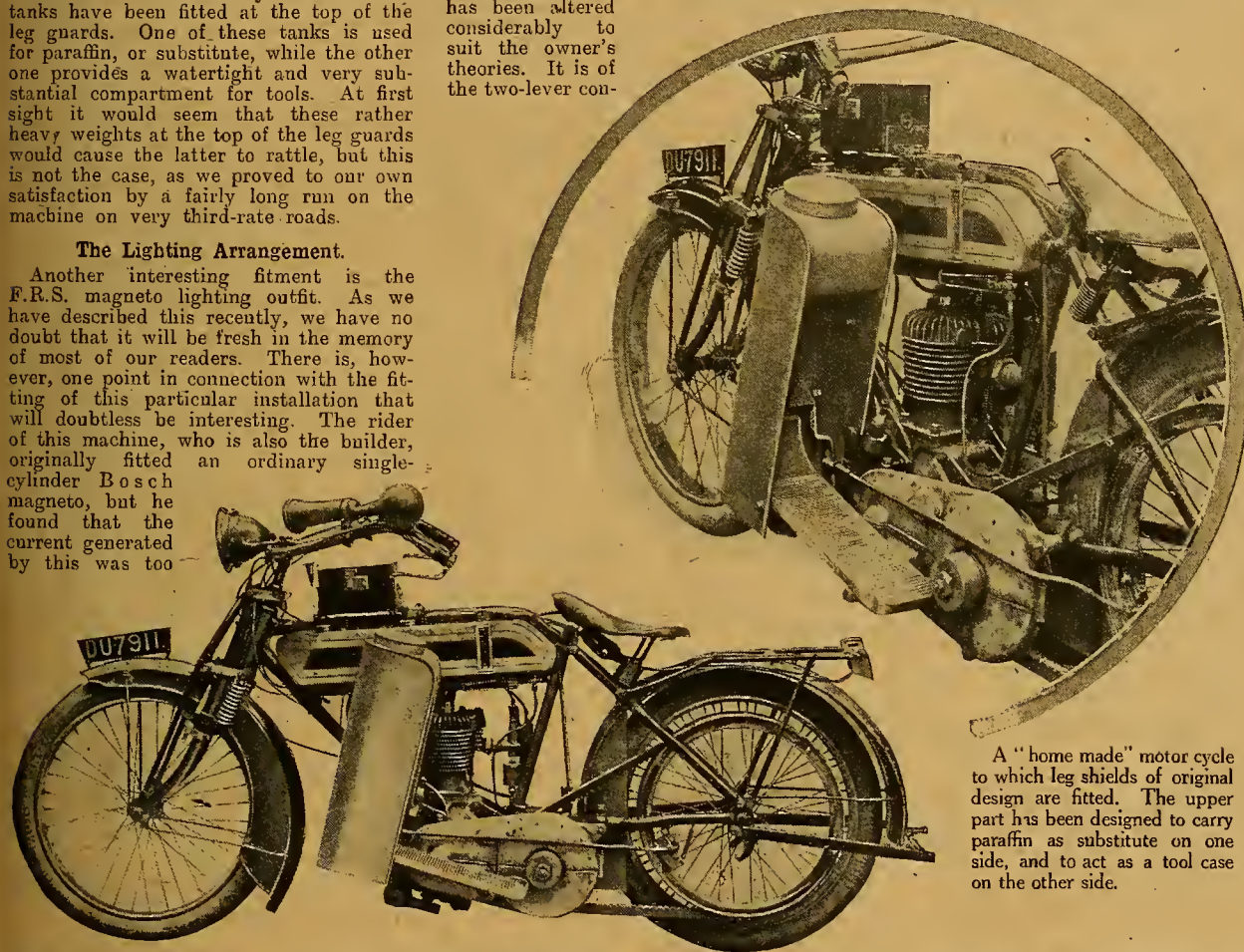
Another interesting fitting is the F.R.S. magneto lighting outfit. As we have described this recently, we have no doubt that it will be fresh in the memory of most of our readers. There is, however, one point in connection with the fitting of this particular installation that will doubtless be interesting. The rider of this machine, who is also the builder, originally fitted an ordinary single-cylinder Bosch magneto, but he found that the current generated by this was too

foot brake, which may be quite clearly seen in the illustrations.

## A Powerful Engine.

The engine is a very old design White and Poppe with a bore of 80 mm. The carburetter is of the Triumph type, but has been altered considerably to suit the owner's theories. It is of the two-lever con-

fashioned two-lever carburetter, in which one had to twiddle the air lever continuously, for the operating of this lever instantly converted the engine into the nearest approach to a  $3\frac{1}{2}$  h.p., ready for a T.T. or a timed hill-climb, that we have had the good fortune to experience



A "home made" motor cycle to which leg shields of original design are fitted. The upper part has been designed to carry paraffin as substitute on one side, and to act as a tool case on the other side.

strong for the lamps, and burnt out their filaments. Consequently, he fitted a two-cylinder Dixie magneto; but then arose a difficulty as to what to do with the current generated that should be providing a spark to a second plug. This difficulty was overcome by fitting a sparking plug into the frame near the base of the cylinder and leading the other magneto wire to it. Thus, when the machine is running, besides a spark in the cylinder, there is also a spark at the plug near the

trol type, but the air lever, instead of operating an ordinary air slide in the carburetter, operates an extra air valve placed on the engine side of the throttle valve. When we took the machine over we were carefully instructed not to open this air valve on ordinary running. However, as the machine seemed rather sluggish, we ventured to disobey instructions and to open the air valve. The result was even more remarkable than it would have been with the ordinary old-

for some time past. The engine is nearly eight years old; but, in spite of this fact, we could not help comparing it most favourably with some of the  $3\frac{1}{2}$  h.p. singles on the market at the present time, or rather, perhaps, in the middle of 1914. The pick-up of the machine proved excellent, its speed very considerable, and its hill-climbing remarkable. The speed gear fitted is a two-speed Jardine with a large clutch, both hand and foot operated.

## TEN YEARS AGO.

ALTHOUGH motor cyclists are not entirely free from criticism in these days, ten years ago the venomous hatred the sight of a motor cycle inspired in the breasts of some people was most amusing. One writer, in venting his spleen against the pastime, said that he could not conceive how an enlightened

public could suffer motor cyclists to exist at all. They resemble a portmanteau on wheels, with a hunchbacked devil crouching on the top. This hare-brained critic, being in good form, concludes a long tirade with the assertion that he had seen some people look happy in motor cars, but never by any chance had he seen people

look happy on a motor cycle. Of course, such judgment was common in those days of intolerant prejudice, when motorists were the recipients of that hatred previously given to cyclists. But a portmanteau on two wheels... and an unhappy motor cyclist! What next? Who ever saw an unhappy motor cyclist?



# THE Critic

Fireside Chats on  
Motor Cycle Problems

## AVERAGE SPEEDS.

THE D.R. stated that a friend had written to him on the subject of average speeds. This man earnestly pleaded enlightenment on the subject, saying that he had occasionally read letters in the motoring press in which writers proclaimed most extraordinary average speeds over long distances. The D.R.'s friend, though a man of some experience, had never been able to obtain such results; "and therefore," said the D.R., "I want the opinions of you chaps on the subject. What are your experiences of fair average speeds for the various powers of machines?"

The Journalist took the allusion to the press as aimed at him. "We do not hold ourselves responsible for the opinions of our readers," he quoted. "And no one knows better than we do that the ordinary motor cyclist has but the haziest notion what he is talking about when on the subject of averages."

"Gee! I should think it is!" exclaimed the Discharged Soldier. "What is the greatest distance you have done in one hour's sane riding?"

"I have done thirty-seven miles in the hour," stated the Journalist. "That was over present-day roads on a flat twin Brough. I may have done more—probably have—but I never troubled to time myself."

"And what would you average on the same machine on a journey of, say, 140 miles?" queried the Manufacturer.

"Probably 30 m.p.h. at the outside, not including drin—smokes!"

"That's about what I thought," observed the D.R. "What is your experience?" He turned to the Manufacturer.

### What High Average Means.

"I once went to Thirsk from Coventry. From Coventry to Newark the time occupied was 2h. 5m., and I proceeded from Newark to Doncaster in one hour, but that was in the very early morning. I did thirty-eight miles inside an hour. It was Creyton's machine, which had a single gear of  $4\frac{3}{4}$  to 1—a T.T. Triumph. I have travelled from Newark to Coventry (fifty-eight miles) *via* the Fosseway, during pouring rain, in 1h. 40m. All this was on open pre-war roads."

"And you were hogging it then," observed the Discharged Soldier; and next he questioned the Novice, who claimed to have done sixty miles in two hours on a  $2\frac{3}{4}$  h.p. Enfield. "I consider," he added, with visible expansion, "that *that* was my most notorious trip."

"Which goes to show that men who claim an average of 45 m.p.h. are related to Ananias!" observed the D.R.

"Or else that they are ignoring all consideration for other users of the road," added the Journalist. "If we could get rid of such bounders it would be a good thing for the pastime. My present machine is capable of 40 m.p.h. on middle and probably 60 m.p.h. on top, but under no circumstances whatever would I attempt to do forty-five miles in the hour off the track."

"Do you think you *could* do it?" queried the Manufacturer.

The Journalist pondered. "I very much doubt it, unless I could pick my road. To average thirty means keeping the needle between forty and forty-five nearly the whole of the time; to average forty-five means hovering between fifty and sixty."

"And I very much doubt it," maintained the Manufacturer. "On a T.T. Scott—probably the ablest machine on the road for high averages—I have, on deserted mountain tracks in the early morning, licked up astounding distances in the twenty minutes and half-hour, but I know what it means to cover forty-five miles in the hour."

### Sidecar Speeds.

"But let us come down to the *ordinary* rider," put in the Novice. "Take the man of the same stamp as myself, who sits his machine like a grid-iron. You chaps have a happy swing of the body which takes you safely round corners, and you never find yourself on the wrong side of the road by miscalculating your cornering abilities. What should I be able to do on, say, a good  $3\frac{1}{2}$  h.p. with sidecar and passenger?"

The general opinion was that he would be able to do about the same as he could do solo on a good baby two-stroke—about 23 m.p.h. average.

"And even that," added the Journalist, "is too fast for a lightweight. An average of 19 m.p.h. would be more judicious if you considered your engine. As for the  $3\frac{1}{2}$  h.p. sidecar, everything would depend on the road. On a level road, with no head wind, you would do your twenty-three easily, probably twenty-five. If you encountered hills or a head wind, you would drop down to nineteen ere you knew where you were."

"Talking about lightweights," interposed the Manufacturer, "I have beaten your 27 m.p.h. average of the  $3\frac{1}{2}$  h.p. single all ends up both on a  $2\frac{3}{4}$  h.p. A.J.S. and a Sunbeam of the same power."

The Journalist did not doubt it in the least, but considered that neither the Sunbeam nor the A.J.S. was a lightweight in the present order of things.

"But there were others even more remarkable," put in the Manufacturer. "The  $2\frac{3}{4}$  h.p. Humber would do 50 m.p.h.; in fact, on the track, 59 miles 670 yards have been done in the hour on one of these machines."

### The Limit.

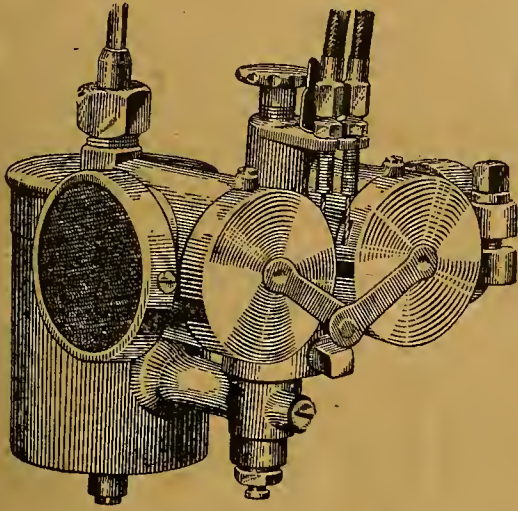
But the Journalist pointed out that those celestial words "the track," and likewise the T.T. course, were to be left out of the discussion. "This concerns British highways," he added, "and our discussion has boiled down to the following facts: That the experienced rider, with the fastest type of machine under him—be it a high-gear V twin, a modern flat twin, or Scott two-stroke, or a T.T. single—can, if he be frivolous side out, average 37 m.p.h. at the outside. That on long journeys and on an average machine he can be well content with 27 m.p.h. That the  $3\frac{1}{2}$  h.p. with sidecar and the baby ridden solo should do 25 m.p.h., except that the baby will leave the sidecar behind against a wind or among the hills. Finally, that some of the  $2\frac{3}{4}$  h.p. singles of 1913 and 1914 were faster than some of the  $3\frac{1}{2}$  h.p. singles. Has anyone anything to add to that?"

"Yes," stated the D.R. "The average rider has an enormously exaggerated notion as to the maximum speed on the level that his machine will attain. Now I guarantee that if you took fifty  $3\frac{1}{2}$  h.p. or 4 h.p. machines, now in the hands of private owners, out of Coventry—the home of the motor cycle—not more than twenty out of the bunch would be capable of touching 45 m.p.h."

The Manufacturer and the Journalist agreed with him entirely. "At 45 m.p.h. the air begins to push one backwards off the saddle. Of course, scores of machines would do it, but the knut need not turn up his nose because the average machine will *not* do it. At 50 m.p.h. the telegraph poles are beginning to whiz past at an alarming speed. Sixty m.p.h. is dazzling, and only a born rider, with nerves of iron, can face it on an ordinary highway."

"So," summed up the D.R., "since we are, apparently, becoming famous, let us give the editor of *The Motor Cycle* something to work on. Henceforth, when the first cousin of Ananias writes him, claiming 45 m.p.h. on a Douglas, let the aforesaid editor despatch to that correspondent a printed form, on which he will find written, 'Refer to The Critics, July 19th issue.' That, I think, would put the tin hat—otherwise the trench helmet, complete with respirator—over his muzzle."





## Some B.S.A. exclusive features.

No. 4.

B.S.A. CARBURETTER.

A POINT of special interest in the B.S.A. Variable Jet Semi-Automatic Carburetter is the ease with which it lends itself to economical motor cycling. Without dismantling, the rider can alter the jet by a slight turn of the adjusting screw, and regulate the amount of petrol vaporized to suit any condition from walking pace to full power for hill climbing. The B.S.A. Carburetter is of the well-known B.S.A. quality, material and workmanship, and the B.S.A. system of perfect interchangeability is strictly adhered to.

Write for Latest B.S.A. Catalogue.

THE BIRMINGHAM SMALL ARMS CO. LTD., 47, Small Heath, BIRMINGHAM.



*For Solo*

*& Sidecar.*





# THE Douglas IN AUSTRALIA

has made history, and is still continuing to pile up an unapproachable record of success.  
**TWICE in succession the DOUGLAS has Won the 350 c.c. HUNDRED MILE CHAMPIONSHIP.**

1916 (Easter Saturday), South Australia M.C.C. 100 Mile Championship—Yorke's Peninsula.

A. Limb. - DOUGLAS - FIRST  
Time: 2 hrs. 51 mins.  
A. E. J. Klose - DOUGLAS - THIRD

1917 (Easter Saturday) South Australia M.C.C. 100 Mile Championship—Yorke's Peninsula.

H. J. Gard - DOUGLAS - FIRST  
Time: 2 hrs. 34 min. 3 sec.  
G. A. L. Williams DOUGLAS - SECOND  
A. E. J. Klose - DOUGLAS - THIRD

1917, January 29th, South Australia M.C.C.

**ANNUAL HILL CLIMB, SELICK'S HILL,**  
300 to 350 c.c. Class.

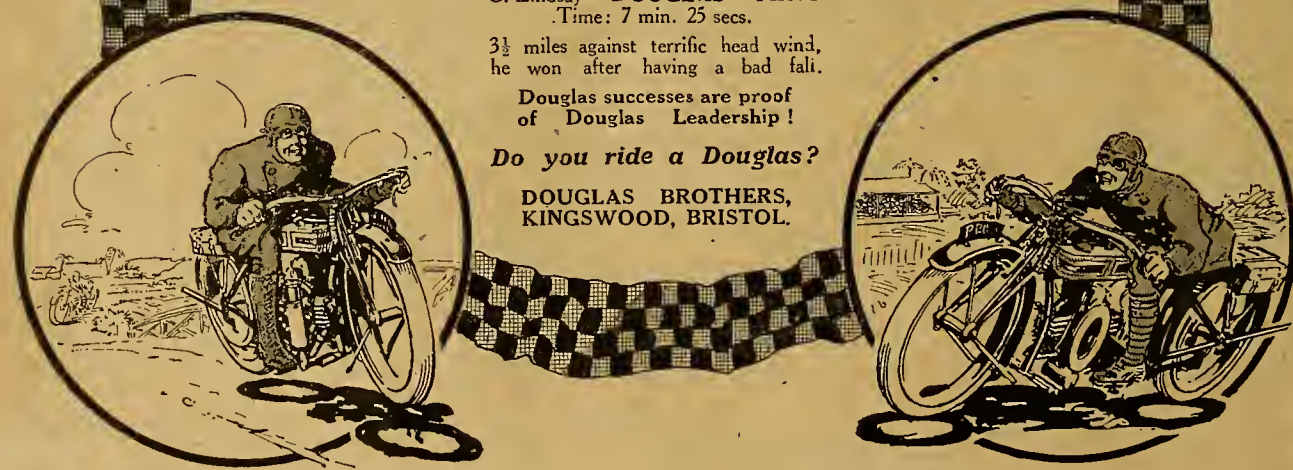
C. Lindsay - DOUGLAS - FIRST  
Time: 7 min. 25 secs.

3½ miles against terrific head wind, he won after having a bad fall.

Douglas successes are proof of Douglas Leadership!

**Do you ride a Douglas?**

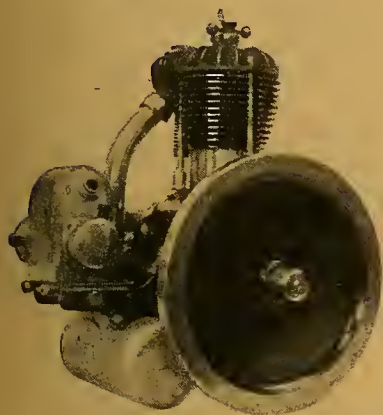
**DOUGLAS BROTHERS,  
KINGSWOOD, BRISTOL.**





## A DISTINCTIVE DESIGN.

The Blackburne 85 × 88 mm. Engine with Outside Flywheel and Side-by-side Valves.



The Blackburne 3 1/2 h.p. power unit. The engine is 85 mm. × 88 mm. = 499 c.c., and is one of the very few engines of that horse power possessing an outside flywheel

THE employment of the outside flywheel, though the usual practice on every type of gas, steam, and motor car engine, is seldom seen on 3 1/2 h.p. single-cylinder motor cycles. Of recent years, however, its use has become more prevalent, all the small two-strokes being so fitted, and of necessity all the flat twins. When the smooth running of any engines possessing outside flywheels is



The one-piece crankshaft as well as the connecting rod is substantially made. On the left, inlet and exhaust rockers mounted on single boss

der. The crankshaft is forged, and a split big-end used, this latter being provided with an oil scoop, which assures a plentiful supply of lubricant for this important bearing.

## Steady Turning Movement.

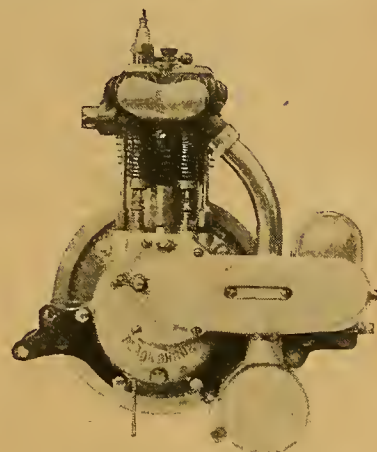
The engine is perhaps most remarkable for its steady pulling qualities and the manner in which it will take an unusually high gear with a minimum of gear changing. This is largely accounted for by the abnormally large flywheel, which has the further effect of transmitting a very smooth drive, and renders the engine especially suitable for sidecar use. When we speak of a large flywheel it must not necessarily be assumed that it is heavier than the usual type, for really the reverse is the case. The efficiency of a flywheel is, of course, enhanced by keeping the weight as far as possible from the centre, 20 lb. at a 3in. radius being equivalent to 10 lb. and a radius of 6in., so far as torque is concerned.

Exceedingly large bearings are utilised in this engine, and undoubtedly these bearings, together with the outside flywheel, have a good deal to do with the sweet running of the engine.

One of the illustrations shows the neat manner in which the detachable cylinder head comes away complete with valve pockets, etc. Not only is this arrangement calculated considerably to reduce the likelihood of cylinder warping, but it is an important point in the matter of accessibility. By simply removing the three top nuts the cylinder head,



The cylinder is pear-shaped, the fins being thin and cleanly cast.



Valve side of the Blackburne engine, showing cradle supports. The compact arrangement of the whole unit is commendable.

complete with valves, etc., can be lifted away so that the grinding in of the valves is relieved of ninety per cent. of its difficulties. With the cylinder head removed, the whole mechanism can be transported to the bench, where the valves can be ground in, and the carbon can be removed—these being, of course, the



The loose cylinder head and valve pockets. Note the design of the valve cap.

recommending points of the detachable combustion head. As for its possible disadvantages, present day improved methods of manufacture have removed most of these, and, given reasonable care, this point of design is practically infallible.

We understand that the makers of this interesting engine intend placing on the market as soon as possible a twin-cylinder engine having an outside flywheel and following, on general lines, the single-cylinder unit here shown.

On the occasion of the first appearance of the Blackburne motor cycle in public competition it carried off a gold medal in the A.C.U. Six Days Trials and in the London-Edinburgh M.C.C. Trial.

The details of the machine follow standard practice, a Sturmey-Archer three-speed gear box being fitted. The clutch is handle-bar-controlled, and the drive by chain and belt.



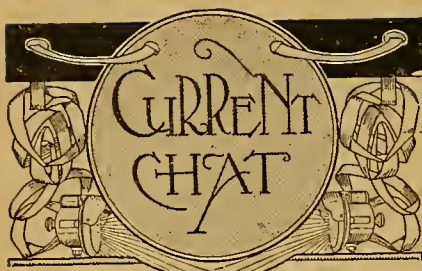
Timing pinion and cam machined from the solid.

taken into account, whether having the even torque of a flat twin or not, it is rather surprising more single cylinders do not possess them, especially those designed for sidecar work. There is a good deal to be advanced in their favour, and they are suitable for any class of motor cycle. The curious thing is the very machine which would benefit most by outside flywheels—the 3 1/2 h.p. single—usually has them inside.

## Loose Cylinder Head.

There are one or two exceptions to this rule, among them the Blackburne. This engine possesses, an exceedingly neat power unit, embodying several points of up-to-date design, with which our readers are already acquainted. In addition to the outside flywheel the engine is provided with a separate combustion head, the latter being held down by vertical rods, so designed that they provide a second point of anchorage at the base flange of the cylinder





## SPECIAL FEATURES

MECHANICS OF THE MOTOR CYCLE. COOLING THE ENGINE INTERNALLY.  
AN ITALIAN MILITARY MODEL.

## TIME TO LIGHT LAMPS

SUMMER TIME.

July 19th	...	9.36 p.m.
" 21st	...	9.33 "
" 23rd	...	9.30 "
" 25th	...	9.28 "

## The Inspector of Petrol Consumption.

Brig.-Gen. Sir C. W. King, C.B., M.V.O., who has been appointed from a D.A. and Q.M.G. to be Inspector of Petrol Consumption, is, we understand, acting in a purely military capacity.

## Auto Cycle Union Staff on Service.

All four members of the clerical staff of the Auto-Cycle Union, of military age, joined up at the outset of hostilities, and this 100% show of patriotism has had its sad sequel in 50% casualties.

## A Lady's "Reckless" Riding.

A lady motor cyclist at Newport was recently charged at the police court with failing to stop her motor cycle when requested, and riding at a "reckless rate" with a lady on the carrier. The defendant contended that one could not do much that was daring and reckless with a 2½ n.p. machine and a passenger on the back. A fine of 8s. costs was imposed.

## The New Matchless War Model.

It was mentioned in the issue of June 14th that Messrs. Collier and Sons, Ltd., were about to place on the market a limited number of Jap-engined military model Matchless sidecar combinations, of which we gave full description, and one of the first examples of these to leave the factory is now being exhibited in the window of Messrs. Godfreys, Ltd., 208, Great Portland Street, London, W.1.

## Sports Meeting at Stamford Bridge.

Great interest is being shown by a large number of aircraft firms in the Second Annual Sports Meeting, which will be held at Stamford Bridge on Saturday, July 21st, at 3 p.m., under the auspices of the Y.M.C.A. A splendid array of prizes has been given by the leading firms for the winners of the various events which figure on the programme. Princess Iwa, of New Zealand, will sing the National Anthem and "Land of Hope and Glory," accompanied by the band of the "T" Division Metropolitan Police. H.H. Princess Helena Victoria has kindly consented to present the prizes. Admission 6d., 1s., and 2s. 6d. Further information of this event can be obtained from Mr. J. T. Clark, Sports Secretary, Y.M.C.A., Tottenham Court Road, London, W.1.

## No Motoring to Race Meetings.

The Board of Trade last week issued an Order prohibiting, with certain exceptions, the use of motor vehicles for proceeding to or from race meetings. The new restrictions say that "No person shall use or consume, or cause or permit to be used or consumed, any motor spirit for the purpose of proceeding to or from any race meeting, whether for the whole or a part only of the journey." Six clauses follow, which should very effectively achieve the end for which the

Order was designed. The Order does not apply to a public omnibus plying for hire on its ordinary route.

## Fatal Accident to Army Officer.

A motor cycle accident on July 10th resulted in the death of a gallant officer, Capt. the Hon. Edward Kay Shuttleworth. He was the only surviving son of Lord Shuttleworth, his elder brother having been killed in action in March last. He had seen much active service, and was about to return to the Front.



## MORE NEW USES FOR THE SIDECAR

A cinema operator busily filming a procession during the recent Baby Week. He has converted his A.I.S. sidecar into a temporary grandstand.



**The National War Funds.**

At the week-end the principal war relief funds stood as follow:

The National War Fund (distributed £3,641,622)	£26,213,519	0	0
The British Red Cross Fund	7,095,579	3	5
Tobacco Fund	133,475	0	0

**Motor Cyclist "Specials."**

Dozens of motor cyclists are attached to the Motor Section of the Coventry Special Constabulary, and a fine batch of men and machines were ranged up for the annual inspection on Gosford Green on July 14th.

**Petrol and Private Users.**

According to a definite statement made by the Petrol Controller within the past few days, only 10% of the petrol imported into this country is allocated to private owners, including doctors, veterinary surgeons, Government Inspectors of Munitions, Red Cross workers, and other workers of national importance.

**Sad News of a Competition Rider.**

We regret to state that W. Heaton, who competed in the last Junior T.T. Race on an A.J.S. machine, and has performed with conspicuous success in other leading competitions, passed away last week at his home near Manchester, following an attack of pneumonia. Heaton was a pioneer motor cyclist, and nearly a decade ago was a notable performer on Rex machines of that period. Latterly he turned special attention to A.J.S. motor cycles.

**Wounded Soldiers' Outing to Berkswell.**

On Saturday last many wounded soldiers from the Coventry hospitals were entertained by the Rover Co. employees. They were driven in sidecars and brakes *via* Finham Bridge, Gibbet Hill, Westwood Heath, Tile Hill, and Burton Green to Berkswell, where tea was provided at the Institute. The weather was perfect, and the outing proved most enjoyable, as well as health-giving.

**How to Advertise!**

"Wanted, 23in. Twin Triumph Motor Cycle, in good condition.—Particulars, write Box No. —."

We cull the above gem from a provincial daily paper. Possibly a domesticated would-be motor cyclist has got mixed over "Baby" and "Twin."

"Motoring.—Gentleman would like to accompany lady or gentleman for runs in country, evenings.—Box No. —."

**British Imports and Exports for June.**

The Board of Trade returns for June, compared with the previous month, show a decrease of £7,595 in the imports of motor cycle parts and tyres. Of course, no motor cycles were imported owing to the Prohibition Order.

**IMPORTS FOR JUNE.**

No. of motor cycles ..	1915..	1916.	1917.
Value of motor cycles, parts, tyres, and accessories ..	822	57	—
	£65,671	£15,192	£2,214

**BRITISH EXPORTS FOR JUNE.**

It is satisfactory to note an increase of £20,000 in the value of exports of motor cycles and parts over the May figures, and also that this year's totals are higher than the June returns of 1915 and 1916.

No. of motor cycles ..	1915.	1916.	1917.
Value of motor cycles, parts, tyres, and accessories ..	1,020	1,016	1,088
	£68,162	£71,187	£80,951

**PETROL IMPORTS.**

Number of gallons imported in June:	1915.	1916.	1917.
12,662,635 ..	19,820,337 ..	11,327,434	
The number of gallons imported during the six months of this year was:			
January ..	..	13,001,740	
February ..	..	12,257,984	
March ..	..	9,246,546	
April ..	..	10,258,951	
May ..	..	12,270,934	
June ..	..	11,327,434	

Total amount of petrol imported for the half year was 58,363,589 gallons.

**RESULT OF THE NEWCASTLE (STAFFS.) RED CROSS DRAW.**

**1st PRIZE TICKET:**  
Triumph Two-stroke } **80252**  
or £50

(Holder: A. JAKINS, Durham House  
Crouch Hill, London, N.)

**2nd PRIZE TICKET:** } **151997**  
Shetland Pony.

(Holder: H. U. DUNN, Fore Street,  
Praze, Cornwall.)

**AVERAGE PRICES.**

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average. The word "combination" indicates a sidecar outfit as supplied by the makers, while "sidecar" implies that the fitting has been carried out by the owner.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3½ 2-speed .....	—	£40
A.J.S. ....	1916	6 combination ..	—	£92
" .....	1914	6 combination ..	£65	£58
" .....	1916	4 combination ..	—	£78
Aillon .....	1916	2½ 2-speed .....	£35	£30
" .....	1914	2½ 2-speed .....	—	£27
Ariel .....	1915	3½ 3-speed .....	—	£43
" .....	1914	5-6 combination ..	—	£51
Bat .....	1914	6 3-speed .....	—	£48
Bradbury ..	1914	4 2-sp. sidecar ..	—	£41
Brough .....	1916	3½ 3-speed .....	£65	£55
" .....	1915	3½ 2-speed .....	—	£47
B.S.A. ....	1916	4½ sidecar .....	—	£64
" .....	1915	4½ sidecar .....	£49	£58
Calthorpe ..	1916	2½ 2-speed .....	£35	£30
" .....	1915	2½ 2-speed .....	£27	£27
" .....	1916	2½ 2-stroke .....	£33	£26
Clyno .....	1915	2½ 2-stroke .....	—	£26
" .....	1914	6 combination ..	£69	£63
Connaught ..	1915	2½ 2-stroke .....	—	£25
Douglas .....	1916	2½ 2-speed .....	—	£46
" .....	1915	2½ 2-speed .....	£41	£40
" .....	1914	2½ 2-speed .....	£35	£35
Enfield .....	1916	6 combination ..	£66	£73
" .....	1915	6 combination ..	£70	£63
" .....	1916	3 2-speed .....	£46	£45
H.-Davidson ..	1916	7 combination ..	£90	£84
" .....	1915	7 combination ..	£70	£67
Headerson ..	1916	7 combination ..	—	£100
Hazlewood ..	1914	6 3-speed .....	—	£30
Humber .....	1916	6 combination ..	—	£60
Indian .....	1916	5 combination ..	—	£64
" .....	1916	7-9 combination ..	£75	£78
" .....	1915	7-9 combination ..	£71	£67
James .....	1916	4½ combination ..	—	£58
" .....	1916	2-sp. 2-stroke ..	—	£31
Lea-Francis ..	1916	3½ 3-sp. sidecar ..	—	£67
Levis .....	1916	2½ Popular .....	—	£26
" .....	1915	2½ Popular .....	£21	£21
Matchless ..	1915	7 combination ..	£79	£70
New Hudson ..	1916	2-sp. 2-stroke ..	—	£28
" .....	1916	4 combination ..	£65	£50
New Imperial ..	1916	2½ 2-speed .....	£35	£34
" .....	1915	2½ 2-speed .....	£24	£24
Norton .....	1916	3½ 2-speed .....	—	£52
" .....	1915	3½ T.T. ....	£13	£44
O.K. ....	1916	2½ 2-stroke .....	£10	£20
P. & M. ....	1915	3½ combination ..	—	£65
" .....	1914	3½ combination ..	£50	£52
Premier .....	1915	2½ 3-speed .....	—	£28
" .....	1911	3½ 3-speed .....	£45	£45
Rover .....	1916	3½ 3-speed .....	—	£2
Royal Ruby ..	1916	2½ 2-stroke .....	—	£24
Rudge .....	1916	3½ Multi .....	—	£46
" .....	1915	3½ Multi .....	—	£37
Scott .....	1916	3½ combination ..	—	£58
Sun .....	1915	2½ 2-speed .....	—	£23
Sunbeam .....	1916	8 combination ..	—	£100
" .....	1916	3½ solo .....	£76	£74
" .....	1915	3½ combination ..	£80	£78
Triumph .....	1916	2-sp. 2-stroke ..	£39	£38
" .....	1915	4 countershaft ..	—	£55
Velocette .....	1916	2½ 2-sp. 2-stroke ..	£30	£30
" .....	1915	2½ 2-sp. 2-stroke ..	—	£25
Zenith .....	1915	8 Gradua .....	—	£61

**ROVER CO.'S EMPLOYEES' OUTING TO WOUNDED SOLDIERS.**

Sidecars and brakes ready for proceeding along the route after partaking of refreshments on Gibbet Hill, near Kenilworth (see paragraph).



## MOTOR CYCLES FOR THE FRONT.

How New and Repaired Motor Cycles  
are Distributed to the Army.



**I**N the issue of *The Motor Cycle* of June 14th we published a series of interesting photographs of derelict motor cycles saved from the war. Several readers have noticed these machines from the railway which passes the A.S.C., M.T., Depot, and many have got hold of the idea that the more hopeless ones would be sold by auction.

The object of our visit to the depot was to find out the real state of affairs, and it will be remembered that we were told that every one of these machines, except a very few which were irreparably smashed up, was overhauled by Army mechanics and was renovated.

Our next visit was to another depot, which is probably the largest of its kind in England, if not in the world. To this

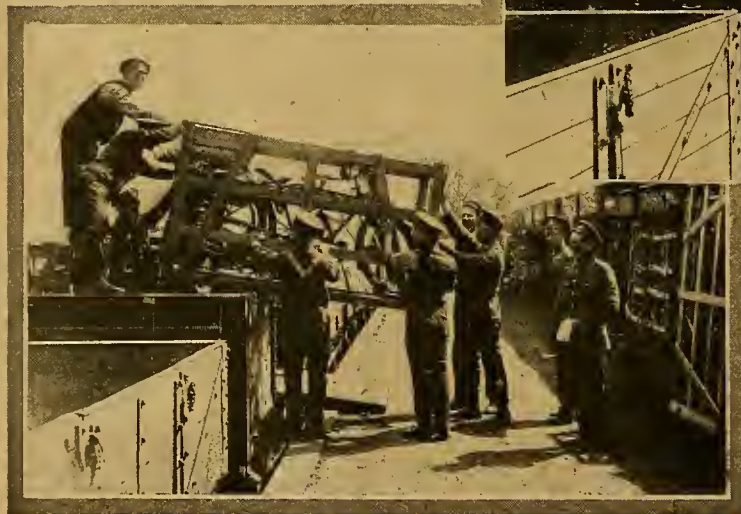
place are sent all the new machines which are delivered to the Army, as well as those which pass through the repair works. The depot last visited is the distributing centre for all types. To it are sent



The crated motor cycles being taken from the goods train to the shed.

motor cycles from various corps and units for repair, and they are then sent to the chief M.T. repair depot, being returned here when they are ready to be distributed to different parts of the world.

Very shortly after our arrival we were taken by the C.O. to a railway siding at which there were being unloaded crate





**Motor Cycles for the Front.—**

after crate of Douglas and Triumph motor bicycles, which are the two favourites in the Army, and in addition to these a few other makes were to be seen in the neighbourhood, such as Rudge, Clyno, Indian, and B.S.A. It will be remembered that when motor cyclists first enlisted under the voluntary scheme in 1914 they were told to present themselves with their machines, and in a good many cases these were taken over at valuation. Many of these are still surviving, as we noticed, carefully protected by tarpaulins, such non-military makes as Scott, James, Premier, Harley-

Davidson, N.U.T., A.J.S., Humber, Thresher-Jap, Chater-Lea, New Hudson, Ariel, Bat-Jap, Bradbury, and Connaught.

Books are kept of the machines received and despatched each day, and if the figures in these books were available to the public they would make interesting reading. Very few repairs are done at this depot, the work there being to keep the various units supplied with motor cycles and cars.

The officer in charge of the motor cycles is a clergyman, who patriotically resigned his living and eventually became an officer in the A.S.C., M.T.

Where space under corrugated iron sheds is available motor cycles are stored under these, but when all the space under cover is taken up machines are left in their crates and are protected by means of tarpaulins, all bright parts being liberally smeared with grease. There are probably a couple of hundred lying in a field adjacent to the railway siding which are in a very bad



A convoy of Douglas sidecars ready to start for an A.S.C. camp.

Part of a group of broken-down motor cycles of various makes ready for repair. The tarpaulins have been specially removed to allow us to view the machines.



Unloading crated motor cycles from a railway siding adjoining the A.S.C. depot.

state of repair, and even these are covered up, as they should be to prevent further damage.

This depot covers a large area, and between the various sheds, under which all types of motor vehicles ever conceived are stored, are excellent tarred roads made of ashes from the surrounding waterworks and laid down by the A.S.C. men. Altogether the stock of motor bicycles in this particular depot exceeds 2,000.



# Military Notes

## DESPATCH RIDERS IN BAGHDAD.

OF course, motor cyclists took part in the occupation of Baghdad. No army is complete without the ubiquitous despatch rider. From Cpl. Wm. Hall, attached to the Indian Expeditionary Force, who, before the war, was a well-known member of the Ripon Motor Cycle Club, we have received the following interesting letter:

'Herewith pictures showing two D.R.'s attached to Brigade Headquarters in the historic city of Baghdad.

"The life of a D.R. out here in Mesopotamia is not an easy one. The roads are exceedingly bad, and in going across the desert one has to look out very carefully for loose sand, in which the motor cycles skid about frightfully, also deep nullahs which were formerly used for irrigating the land.

"The two D.R.'s shown (Art.-Cpl. Crichton-Smith and myself, Cpl. Hall) have been about twelve months in this country, and took part in the recent advance to Baghdad. This was a very trying time for men and machines, and a

good number of the latter suffered from overheating. Sandstorms were almost a daily occurrence, which greatly added to the discomfort of everyone. Some D.R.'s who had to leave the column with despatches had encounters with hostile Arabs, who are a source of great annoyance. More than one D.R. has lost his life by them.

"Baghdad was reached on —, and it was a very pleasant change to be able to buy a few luxuries in the numerous bazaars here thronged with people of all nationalities. There are large numbers

of motor cycles in this country, namely, Triumph, Douglas, Ariel, Rover, B.S.A., and A.J.S., and the way they stand up to the rough work is marvellous."

## FROM THE TRANSVAAL TO ENLIST.

B. C. WOODWARD, of Germiston, Transvaal, has recently arrived in England with the intention of "joining up." Mr. Woodward will be known to many South African readers, as he was a member of the firm of Ross and Woodward, motor engineers, who handled several makes of motor cycles and light cars in the Germiston district. Mr. Woodward has been a constant competitor in motor cycle events organised by the Rand Motor Cycling Club, and has competed in the Johannesburg-Durban road races, and was, indeed, the first to attempt the non-stop run with a sidecar from Johannesburg to Durban. During the rebellion in South Africa Mr. Woodward served for a short period as a despatch rider with the mounted squadron which rounded up a Muller crowd of rebels in the Eastern Transvaal. Mr. Woodward's partner, Sec.-Lt. Donald Ross, of the 4th South African Infantry, was killed in action in Delville Wood.

We have assisted Mr. Woodward, as a man of very wide motor experience, to join a technical section of the Army, and he has our very best wishes.

## 520 H.P. BIPLANES.

SOME particulars of the latest Hun raider will interest motor cyclists.

Those which raided London recently were propelled by two six-cylinder water-cooled Mercedes engines, each of 260 h.p. and a bore and stroke of 160×180 mm., with propellers aft. They are known as the Gotha type, the planes measuring 77ft. 8in. across the wings and the length being 40ft. 8in. Each carries four guns, and the normal speed is about 80 m.p.h.



Despatch riders in the ancient city of Baghdad. The mounts are a Triumph and an Ariel



Judging from the dilapidated houses in the background, the City of "Arabian Nights" received the attention of our gunners previous to the occupation.



## SERVICE ON FOUR FIGHTING FRONTS.

CONGRATULATIONS to Sec.-Lt. F. P. Mayell, who was married last Saturday to Miss Katie Bendall—his passenger always in the Indian sidecar in pre-war days.

It is many months since we heard of Mayell, who was a former official of the Sutton Coldfield A.C., the last communication coming from Egypt. Consequently, we were delighted to meet him last week during a brief leave from a most strenuous war-time existence.

Mayell has over two and a half years' Active Service to his credit, spread over four different fronts—Gallipoli, Sinai, Macedonia, and against the Senussi. Originally with the Warwickshire Yeomanry—his chum being J. H. Parsons, the Warwickshire cricketer—he took part in a bayonet charge on Hill 60 at Gallipoli, was in a cavalry charge at Quatia, and has since been four times "over the top." It was only with difficulty that we abstracted this news from our friend, who is of a naturally retiring disposition, and his chief concern when seeing us was to acquire information as to how to obtain a transfer to the "Tanks," about which he is very keen. A corporal in the Warwickshire Yeomanry, he obtained a commission last year, and is at present attached to the Worcestershire Regiment. He was disporting himself on a Baby Levis last week, though his pre-war mount was something more powerful—usually a Triumph or a twin Indian. Notwithstanding his varied experiences, Mayell looks wonderfully fit, and is possessed of the right spirit. He pointed to a scar on his forehead as the only

war scar he had to show; but we observed his service ribbon for the Boer War.

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## OVER 12,000 MILITARY LETTERS.

LETTERS of application to *The Motor Cycle* on recruiting matters since war broke out have now reached a total of 12,803

□ □ □

## THE YOUNGEST DESPATCH RIDER.

ARROCHDALE reader raises the interesting question as to who is the youngest motor cyclist despatch rider to go on foreign service. The reader in question, Mr. W. Roughley, writes:

"I have wondered many times when reading *The Motor Cycle*, with occasional topics on despatch riders, if it is known who actually is the youngest D.R. to go on foreign service? My reason for the question is that my son, William Norman Roughley, who is a D.R. attached to the Royal Engineers, went out to France when he was 18 years 2 months old. I should like to hear if any of your readers can beat this. He has now been on active service nearly sixteen months."

□ □ □

## A MOTOR CYCLING COLONEL.

IT may be of interest to those motor cyclists who are serving in the A.S.C. to know that their Colonel in charge of records is an enthusiastic rider of a two-speed Baby Levis. He informs us that he wishes for nothing better, and he thinks little of getting up early in London in the summer months and riding down to some south-eastern seaside resort, breakfasting at Canterbury, then having a bathe in the sea at noon and luncheon afterwards, getting back to Town, after having tea at Maidstone, comfortably in time for dinner.

Colonel Horniblow considers that for those who wish to travel at a reasonable speed—say, twenty miles an hour—and who desire safety in all weathers, and have an eye for economy and simplicity, a two-speed two-stroke is unquestionably the machine to ride.

His advice, as an experienced horseman and polo player, is always to treat one's machine like one should a horse: study it, husband it, and care for it, and then profit and pleasure will be the result both to maker and user. Colonel Horniblow is a member of the A.C.U. and A.A., and looks forward every Thursday to *The Motor Cycle* for all the latest inventions and improvements.



Col. F. Horniblow, C.B., a keen motor cyclist.

□ □ □

## KILLED IN A PRACTICE FLIGHT.

WE have been informed, and learn with much regret, of the death of Fl.-Lt. Ronald Morrison, whose neck was broken through his aeroplane suddenly nose diving during a practice flight and crashing to earth. He was well-known in pre-war days at hill climbs and Six Days Trials as an amateur Douglas rider. He joined the R.N.A.S. in August, 1914, and was one of Com. Samson's four despatch riders, Cyril Pullin (invalided), Harold Plaister (invalided), and Reggie Poynting (dead) being his companions. He served in France, Belgium, and the Dardanelles.

□ □ □

## MOTOR CYCLISTS IN MESO-POTAMIA

LANCE-CORPORAL J. SUMMERS, of the 14th Light Armoured Motor Battery, writes from Mesopotamia: "*The Motor Cycle* continues to arrive regularly and is extremely welcome, as it forms our one link with civilisation, as far as motor cycles are concerned. We gather from your paper that the pastime is lying more or less dormant at present; anyway, let us hope that it will burst out with renewed vigour after the war. We are on the Tigris now, and get a show against 'Johnny' occasionally. We had quite a successful stunt a day or two ago, returning with twenty-nine prisoners, after a rather trying three hours. The cycles are sticking it as well as can be expected, especially when the bad state of the roads is considered."

## PETROL FIGURES.

NEARLY a million gallons less petrol was imported last month than in May. Yet we hear some people prophesying a bigger allowance of fuel. False prophets!

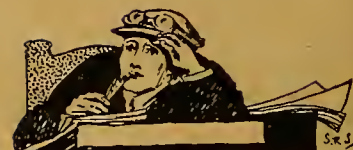


Sec.-Lt. Frank Mayell (Worcesters) and his bride Miss Katie Bendall.



# FLAT TWINS.

"IXION" REPLIES TO A CRITIC.



## Power of Exaggeration.

I MAY disarm a certain amount of criticism by drawing attention to the value of exaggeration.

It is commonly regarded with contempt or amusement. The lying angler and speedster, the enthusiast whose geese are all swans, the elderly relative who habitually adorns every tale, the journalist who works up a commonplace incident into a thrilling event—all alike indulge the same foible, consciously or unconsciously. The literally-minded moralist condemns. The excitable person with no sense of humour works himself up into an indignant passion for meticulous accuracy. The cynic coldly spirts forth his corrosive venom. The genial man of the world grins. Brown, who is accustomed to call a spade a spade, will have none of that paltering word—"exaggeration." Good old-fashioned Anglo-Saxon is his *forte*; and if a mechanic in a hurry describes half an inch as three-eighths, righteous Brown has only one word for it—the word "lie."

The value of exaggerations is twofold. First, the great British public is so confoundedly slow at the uptake that you cannot get an idea into their heads unless you isolate it, beat drums round it, turn million candle-power searchlights on it, catch as many people as you can by the scruff of the neck and rub their noses on it. Secondly, because we are constructed in this curious mould, we are provided with tutors, monitors, leaders, and prophets suffering from a huge lop-sided bias, which enables them to appreciate 99% of one aspect of a subject and practically to ignore all but 1% of the other aspect. For all which reasons it is my chiefest boast and glory that I am, under certain limitations, a naked and unashamed liar in the eyes of good old Brown and other folk of his kidney.

## An Anti-climax.

A meticulously-minded reader in the A.S.C., M.T., has been using my old comments as the Opposition in Parliament employ ancient speeches reported in Hansard against an unshakable Prime Minister. He has dug out, no doubt with commendable pains and accuracy, some weird and astounding claims of mine on behalf of the flat twin. He asserts that I said its birth had sounded the death knell of all rival types of motor cycle engine. I dare say I did. A very proper and useful thing to say. If I said it, I am proud of it. Quite untrue, of course, but most necessary. Where did the flat twin stand when war broke out? Very popular in the 350 c.c. class. Not considered or dreamt of in any other size so far as 80% of the public were concerned. Where does it stand now? Everybody is talking of "flat twins." After the war most riders who can afford to choose, and want the best, will go thoroughly into their merits. What brought the change about? Well, "Ixion's"—thank you, Brown—"lies" have had not a little

to do with it. If I was right, and the good flat twins are worthy to be set on a pinnacle alongside the vertical single and the V twin, my "lies" will have hastened its canonisation; if it is not worthy, nobody will be a penny the worse, except poor "Ixion," who will become a by-word, and may get the sack in addition. My "B.E.F." correspondent sagely opines that I shall one day eat the vow I took in these columns never to ride another vertical single. Bless you, my dear sir, if I ever made that vow, which I really forget, I ate it long ago; I am hunting at this moment for a first-rate single. Am I repentant? Not a bit of it. I feel quite normal, thank you, except that I am rather amused.

## The Faults of Flat Twins.

To show that when my "lies" have done their work I can be perfectly fair, let me quote my correspondent's catalogue of the deadly sins to which the flat twin is heir. According to him this particular type of engine is invariably prone to the following weaknesses: (1.) Abnormal cylinder and piston wear. (2.) Worn, noisy, and insecure valve mechanism. (3.) Bent crankshafts. (4.) Loosened main bearings. In his opinion these defects may chiefly be traced to excessive r.p.m. Here's a fresh bone for the dogs to quarrel over. My own opinion is reserved for the nonce.

## Evidence and Opinion.

Perhaps my foregoing confession deserves to be balanced by a statement. "B.E.F." suffers from a delusion common to many other readers of technical journals. He pictures a journalist as a needy, out-at-elbows individual, who wanders round Coventry or Portland Street begging for the loan of a machine, and who subsequently "writes up" the machine in superlatives, with an eye to the future favours of the same sort. So he speaks of my "lies" as being based on personal sampling of one type of machine, most probably a "starred demonstration" mount. I don't know who invented Grub Street, but it dies uncommon hard. Let me assure him that I am honestly quite an opulent type of individual. I had a glass of port at dinner, and I am now smoking a cigar which isn't a Flor di Fiasco. I have several machines of my very own, and I spend several hours a week in writing diplomatic letters to eager makers who want to lend me machines which I have no wish even to see. My opinions of the flat twin may be foolish, as "B.E.F." considers; or downright lies, as Brown would prefer to stigmatise them: or a judicious overstatement, planned to wake a sleepy public to the high merits of a newcomer, as I regard them. But in any case they are honest, and based on an enormous mileage distributed over many types and sizes, makes and years. The flat twin is not so new as many seem to think, *The Motor Cycle* was talking of it over ten years ago.



# SOME BIKE, SOME NIGHT, SOME MINE



By G.D.

I GOT up from my table at eleven o'clock on the evening of the 6th of June, and, throwing on a Burberry and an old gas helmet, I strolled to the cowshed garage and jerked my motor cycle from its stand. A few seconds later the engine was barking healthily, and I was jolting over the wooden track which leads from our headquarters.

It was an odd hour for motoring, and nothing but the most urgent business would have dragged me from my billet. But the attack on the lines of the enemy just south of the famous salient, though we knew it to be imminent, had come on all too quickly for my arrangements, and a forward telephone exchange, to be working by "zero," was as yet unprepared. I had despatched a lorry-load of men and appliances, and, timing my own journey, I set out to meet them in the reinforced cellar of an old French farm.

## Lights Strictly Forbidden.

A day later I might have taken my lorry there in daylight, or in darkness I could have used the most powerful of head lamps with safety. But at the time the country I traversed was in full view of the enemy on the opposite ridge, and the use of a light of any description, apart from the fact that it was strictly forbidden, would have drawn shell fire on the roads as I left them, harmless perhaps to myself, but very much the opposite to the slow-moving limbers and transport that rattled their way to the infantry in the front line trenches.

The actual roads were unknown to me, for previous visits to the farm had been made across country on foot; but a study of the map left me in no doubt of my direction. I was all unprepared, however, for the ghastly state of riding that prevailed when I had mounted the crest that was our boundary for daylight motor cycling.

As the crow flies, my destination was scarcely two miles from the ridge I have mentioned, but by road it was double the distance. The night was intensely dark, with clouds that hung heavily in the sky. Added to this there was the clatter and rumble of the vehicles that

occupied the best part of the road, and there were the pits and half-filled shell holes that abounded under their layer of dust at the edges of the *paré*.

## Riding by Shell Light.

For a while I struggled forward, my hands feeling clutch and throttle, and my foot upon the brake. For the most part I was in first gear, but at times, as star shells relieved for a moment the blackness of the surroundings, I would kick into second, and would speed up a few yards till the star shells died out and the darkness appeared to be intensified. Then I would cram on the brakes and crawl slowly forward till my eyes once more picked out the details of the track before me.

It was a night of noises that would be hard to compare. Behind me the steady reassuring rumble told of the "Heavies" that were pouring their metal and explosion to the German trenches and back areas. In front, and on all sides, were the sharp cracks of the field guns, and the comfortable "thump" of the "4.5" howitzers. Mingling with them all was the rattle of transport on cobbles, and almost unheard by comparison were the whistle and "Phil" of the gas shells that the enemy was raining on the fields around us.

## Gas Shells.

So gradually I made my way, and my trusty Triumph chugged with a steady beat, whilst the exhaust pipe glowed as if in remonstrance to the heavy treatment. And when I was little above a mile from the farm my eyes began smarting and streaming, and my nostrils proclaimed the existence of tear shells and asphyxiating gas. Then, as a star shell broke out upon the darkness, I glanced at the drivers of the transport about me, and saw that each one of them was wearing his gas helmet.

This, as you may imagine, was sufficient to frighten me to no little extent. Early in the war I had heard



"I would speed up till the star shells died down."



### Some Bike Some Night, Some Mine.—

lectures on the agonies of gas poisoning, and later I had seen men fighting for their breath, with a green foam covering their lips. And I realised with terror that the respirator I carried was not of the new and efficient type, but one of the first examples that I had owned for eighteen months and carried in accordance with the routine order.

I dragged it from its case, and hurriedly pulled it over my head. I thrust the mouthpiece between my teeth, and buttoned my tunic and Burberry tightly over the flap around my neck. And I found to my immense relief that the sickly odour of the gas had gone, and the momentary "tightness" of my lungs had disappeared.

Adjusting the goggles of the helmet, I started the engine, and set off once more over the abominable surface. The guns still cracked and rumbled, and the traffic still clattered as it jerked from stone to stone; but the thick flannel bag about my head had deadened these noises, and the beat of my own engine seemed dim and far away. Now I scarce heeded the holes through which I rode, and more than once I found myself lying in the roadway. These things seemed trivial and unnatural; I felt that I was in a dream, a figure in some way detached from myself, for ever crawling forward in a world of silent noise.

Presently I came to the farm, and drove into the yard more by instinct than intention. My men had already arrived, and were surprised at the sight I presented. I saw that they wore no respirators, and,

pulling the bag from my head, I turned to the work that was on hand.

### The Giant Mine.

The business was nearly completed when the whistle of the gas shells was heard, and the stink of the mixture detected in the cellar. Once more I donned my helmet, cursing myself again as I noticed the comparative comfort of the men in box respirators. Sweating from the heat of the night and the confinement of the cellar, we finished off wiring the exchange, and with considerable relief I jumped on my trusty motor cycle.

I had lost all count of time, and, though I did not know it, it was five minutes past three as I headed again for the highway. The lines of traffic had gone, and, save for an occasional belated limber, the roads were deserted. The guns had stopped firing, and the noise of the earlier night was replaced by a great silence.

Then, as I looked towards the east and noticed the greyness that was rising beyond the ridge, there was a burst of flame that turned darkness into a yellowish glare, and cast long vivid shadows across the roads and fields. Following upon it was a deep crashing roar and a trembling of the ground that can be likened only to an earthquake. And before I had understood it every gun and howitzer was firing at an intense rate on the German line.

It was then that I remembered the rumours of a giant mine, and realised that I had been a spectator of the greatest explosion the world has known.



"More than once I found myself lying in the roadway."

## Springing a Four-cylinder Motor Cycle.

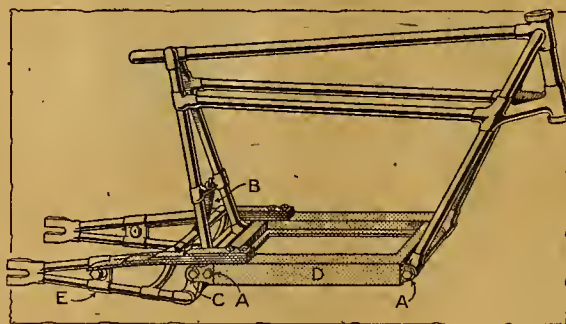
### A Double Frame of Great Lateral Rigidity.

THE campaign in favour of spring frames inaugurated by *The Motor Cycle* has been productive of many excellent designs, suitable chiefly for single and twin-cylinder engines. The following is intended for a three or four-cylinder engine, and the designer, Mr. H. G. Pincott, of West Greenock, describes it as follows:

"The chief aim in the design of this frame is accessibility. The triangular arrangement of the tubes will make the frame very rigid. Channel frame D will support the engine as on a car, and admit of its speedy removal. The drive should be by toggle-jointed shaft and skew gear, the shaft being arranged to slide or telescope to allow springing of the back wheel. By removing the nuts A A and withdrawing

the spindles, the top part of the frame can be removed clear of the engine, and if a suitable stand be arranged to support the frame D, the whole of the engine and details will be clear for adjustment, etc. Also by

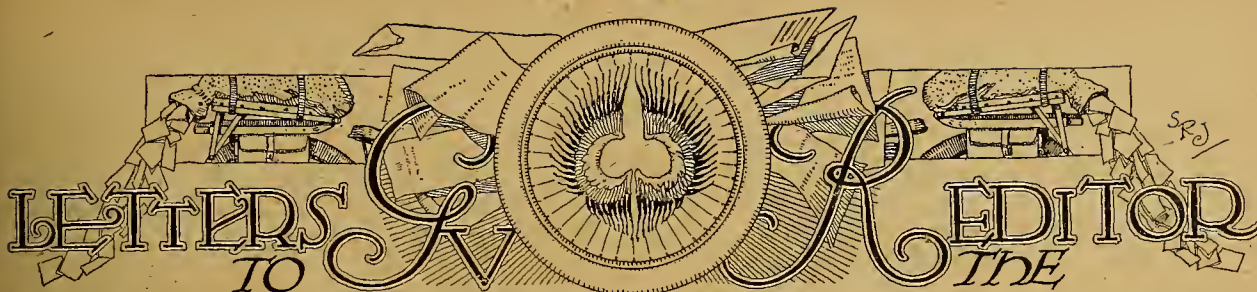
removing nut C and withdrawing the spindle, the back wheel and mudguard can be removed. The rollers E allow free movement of the laminated springs, and the tension spring B takes up backlash when bumping over pot-holes. The mudguard may be held by one or two fly nuts, and the stays pivoted on the wheel spindle inside the forks, so that by undoing the fly nuts and slacking the back spindle nuts, the mudguard can be



A spring frame primarily designed to take a four-cylinder engine.

swung out of the way for tyre repairs. The carrier can be arranged by extending rearward the two horizontal tubes under the tank."





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### AUTOMATIC CARBURETTERS.

Sir,—The article in *The Motor Cycle* for July 5th on one lever carburetters prompts me to ask if you, or any of your readers, can tell me the weak point of the Lukin?

I had one on a twin Rex, also on a Scott, and liked it, and got excellent mileage out of it, and would like to know why it seems to have dropped out. Was it before its time?

JAMES PEACOCK.

Leyburn, Yorks.

#### ELECTRIC HEAD LAMPS.

Sir,—On page 23 of your issue of the 5th inst. a correspondent, under the article heading of "Keeping Fit," states that he uses in his head lamp a Mazda bulb of 4 volts 1.5 amp. I should like to inform your correspondent that the British Thomson-Houston Co., Ltd., have written me to the effect that they manufacture no such bulb, the lowest size made at present being 3 amps. on 4 volts.

Possibly your correspondent uses this identical bulb, and seeing "4 v. 3 amp." thereon, with "Half-watt type," deduces that the actual consumption is one-half of 3 amps. Not so, however. I have one of the bulbs in question, and find it to give round about 20 c.p., and would point out that, owing to the extremely small size and high intrinsic brilliance of the source—the coiled filament operating in an inert gas—it is better suited for fine focus work than wide illumination, such as a motor cycle requires.

L. W. E. HARTLEY.

#### THE BELT-DRIVEN SINGLE.

Sir,—As a keen motor cyclist of over seven years' standing, with riding experience of every type of machine on the market, I should like to express the opinion, which I know to be common to many riders, that the  $3\frac{1}{2}$  h.p. direct belt-driven single will survive for many years amongst sporting riders. Personally, I prefer this type to any other on the road; it is fast, comfortable, and reliable; transmission shock is nil, consequently running cost is light; the engine, under normal conditions, turns over at a reasonable speed, without the fuss of the small twin—either flat or V.

On long journeys I prefer the  $3\frac{1}{2}$  h.p. single, as the small high-speed motor gets on one's nerves. Also, the  $3\frac{1}{2}$  h.p. is capable of maintaining the highest speed the road permits of without suffering unduly rapid wear, whereas the small machines soon knock themselves to pieces, unless the speed is kept strictly moderate.

There are several points, however, to which I should like to direct attention as easily capable of improvement.

(1.) Pistons are too heavy, usually  $1\frac{1}{2}$  lb. to  $1\frac{3}{4}$  lb. can easily be 1 lb. in cast iron, and much lighter in other materials. My own piston (steel) weighs  $12\frac{3}{4}$  oz. complete with rings and gudgeon pin.

(2.) Standard engines are, as a rule, badly balanced.

(3.) Valve gear is heavy and clumsy, and not nearly so frictionless as is desirable.

(4.) The type of roller bearing being fitted to big-ends at present is distinctly bad.

(5.) Flywheels should be external. Internal flywheels should have proper provision for being fitted dead true, both when new and when crank pins, etc., have been removed.

(6.) Crank cases should be of a better material than aluminium, and should be split horizontally instead of vertically. They should not be used as a frame member.

(7.) Cylinders and pistons should be machined throughout, both inside and out. Detachable heads are preferable.

Catford.

K.A.H.

#### THE WASTE OF PETROL IN GOVERNMENT ESTABLISHMENTS.

Sir,—With reference to the petrol shortage, one of the methods of wasting petrol has lately come to my notice. In a certain engineering works engaged on the manufacture of aero engines the following proceedings are carried out on every engine: The engine having been tested—by being run for three consecutive hours—is then dismantled, and pistons, cylinders, cranks, valves, etc., are thoroughly washed—often two or three different times—in the same grade petrol as the engines are run on, viz., the best.

I should say that to every engine turned out of these works one to two gallons of best-grade petrol is wasted in this way.

ENVOLE.

Redruth.

[We have already called attention to the great waste of petrol on several occasions. The use of gas for engine testing has been mentioned in our columns. Moreover, we have drawn the attention of officials to the question, and received the thanks of those in authority.—Ed.]

#### TWO-STROKE PISTON RINGS.

Sir,—Is it possible for you to open your columns for the purpose of ascertaining if any riders have found material benefit from the addition of Oildag to the oil?

My machine is a Junior Triumph. I weigh close on fifteen stone, yet I can run at 35 m.p.h. under favourable conditions (for, of course, short periods), but usually run round about 20 m.p.h., and have averaged just under 90 m.p.g. for the last 1,300 miles.

I, however, found it desirable to take off the cylinder every 700 to 800 miles to be reasonably sure of removing the rings without breaking them, and to remove carbon on the inlet side of piston to ensure a full charge of gas getting into the cylinder, and always found a loss of power and compression for the next 200 miles or so. If I only remove carbon from the piston and exhaust port the machine is always several miles an hour faster, but this probably means new piston rings when I eventually try to remove them.

If Oildag will keep these free for only double the time I would certainly use it, as I can easily dismantle the cylinder, clean off carbon, and replace in about twenty minutes, but when once rings are stuck one never knows what to expect.

If some of your readers, or "Ixion," have been "pioneers," perhaps they may be ready to state their experiences.

PISTON RINGS.

#### BALL BEARING CONNECTING RODS

Sir,—I believe that the question as to whether the pistons of the rotary engine are reciprocating began with a question of the inertia forces of the pistons on the crank pin in connection with the question of roller bearing connecting rods.

"Picardy Pitt" says that they are reciprocating. They are fixed to a centre and revolve. If a part fixed to a centre and revolving is a "reciprocating" part, will he kindly say what is a "revolving" part for the purpose of calculating the inertia forces? Also, will he take an example and give us the actual forces on a crank pin of an engine of the rotating type and ordinary vertical, stating what authority there is for the formula he uses in his calculations? The revolutions and weight of piston stroke can be assumed to be the same.

If any of your readers care to try for themselves the effect of the two different types they can take a ball at the end of



a piece of string. If this is whirled in a circle the string will always be tight, according to my experience. If the ball be jerked to and fro in a straight line the string will not always be tight, in my experience. This simply represents the inertia forces on the crank pin of the rotary and reciprocating engines. Anyone who cares can try this experiment, and can then form his own conclusions as to whether the use of ball bearings in the rotary type of engine necessarily means that they will be equally successful in the reciprocating.

FREDERIC STRICKLAND.

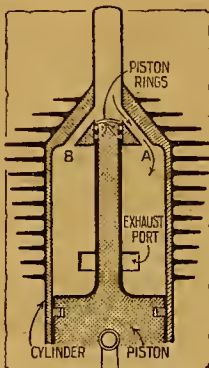
## TWO-STROKE DESIGN.

Sir,—With reference to the suggestion put forward by Mr. E. A. Rolf with regard to two-stroke design, my opinion does not quite tally with his.

First of all there would be every chance of that rod catching on the side of the tube, considering that these engines often turn at 1,500 to 2,000 r.p.m. Moreover, if we got over this difficulty the loss of compression caused by the absence of piston rings would seriously lower the efficiency of that engine. We can get over these difficulties by slightly altering the cylinder design, as shown by accompanying sketch.

But even this would not get over the other difficulties, which would render the engine totally inefficient; these are the increase in weight of the piston, the supplementary friction caused by the rod, and the greater friction caused by the need of a bigger bore to keep up the capacity of engine.

JEAN CALLEBAUT.



The piston is at the bottom of the stroke; the rod, although being still held by cylinder, uncovers holes A and B, through which the mixture rushes.

## SHOCK ABSORBERS.

Sir,—I thank "Chinook" for his reply on the above subject, and I can assure him that I had not overlooked the facts he mentions with regard to the uneven torque at low top-gear speeds.

The hammer and nail analogy I prefer to ignore, since such things are like poison gas, in that they often become as dangerous to the user as to the opponent, and consequently I will confine myself to the actual mechanical problem in hand.

According to my contention, "Chinook" reasons that the final belt drive must be so tensioned that the shock absorbing qualities are lost when running on top gear. I ask if this is not indeed true, in so far as those qualities are dependent upon tension: for undoubtedly the indirect belt is distinctly harsher than the direct, simply because surface slip between belt and pulley is practically eliminated by the increase of frictional contact between them and by the excessive tightness necessitated by the short belt centres.

Such shock absorbing qualities as now remain lie in the elasticity of the material, and also in the fact that at low top gear speeds, when the torque is noticeably uneven, the inertia effect of the whole machine moving through space will tend to cause it momentarily to overrun the engine between each power stroke, with the result that there will be periodically recurring incidents when the belt will be fed over the countershaft pulley, thus allowing slip proportionate to the unevenness of the torque.

If "Chinook" has ever ridden machines fitted with N.S.U. or Millennium engine shaft gears he will need no further proof of the necessity of excessive tension to counteract the slip induced in a geared-down belt transmission.

The above mentioned shock absorbing powers in a final belt drive will be non-existent in the low-speed device suggested. Moreover, the large amount of frictional area and spring pressure would form such an obstacle to compactness of design that it is scarcely conceivable that it could be added to rear sprockets already cluttered up with internal brakes, detachable wheels, and chain cases. Again, if steel and bronze plates were used, provision would have to be made for constant lubrication and the exclusion of grit—no mean difficulty when one recollects the interior condition of

many "totally enclosed" coil spring "cush" sprockets, whilst the dry plate (Ferodo) type, necessarily bulky even as a high-speed clutch, would become a monstrosity in this position.

In conclusion, I must thank "Chinook" for the pleasant chain of associative memories aroused by his mention of Park Rash. May we all have the good fortune to be able to resume our hill-hunting expeditions in the near future.

WHARFEDALE, A.S.C.,—M.T.

## KONKING ON HILLS.

Sir,—I should be greatly obliged if any of your readers could account for the following phenomenon which occurs with a well-known long-stroke single-cylinder motor cycle engine. It has puzzled me for a considerable period, and I confess I am beaten.

When I start from cold, the acceleration is terrific—the engine will roar away in fine style—with no suspicion of a konk or a knock. But if I have been running for a short time—say ten minutes—and I stop for a minute and then start again, while the engine is picking up a series of tremendous konks occurs, as though the cylinder were being hit by a hammer.

Now I have often been prevented from climbing a stiff hill owing to this wretched konk. If I can manage to rush the hill I shall get up all right, but if I slow down whilst climbing I cannot manage to get up at all; but if I stop halfway up the hill, and allow the engine to get absolutely cold, I shall roar up the hill without the slightest difficulty.

I have noticed that when these konks occur a cloud of bluish smoke always comes out of the exhaust pipe, following the stroke of the piston; this would look like a mixture knock, but I do not think it is. The valve timing is absolutely correct; I have checked it several times. The ignition is timed correctly. Mixture right. I have tried bigger jets, smaller jets, extra air, etc. There are no air leaks. The cylinder never gets at all hot. I am certain the plug points do not get incandescent, and there is no doubt that it is not a carbon particle.

Can any of your readers tell me why this is? The engine, by the way, is 100×79.

H. W. WILLIAMSON (Lt. M.G.C.).

## AN IDEAL MOUNT FOR A LADY.

Sir,—As a rider—civil and military—of some ten years' experience, I should like strongly to back up your correspondent, "H.C.T.P.," in advocating the two-stroke as having every advantage for a non-mechanical rider, lady or gentleman. My mount has been on the road for three years without a single mechanical stop of any kind. My wife had about ten minutes' instruction on it and then at once successfully completed a forty-mile journey—she had never had anything to do with any kind of motor previous to that occasion.

The three disadvantages put forward by your correspondent do not bear much weight with a properly lubricated mount. (1.) "Cylinder more apt to get heated quickly" is a comparative statement of no value; it need not, and mine does not, ever overheat if driven reasonably.

(2.) "Crank case always having to be kept compression-tight" is an absolute fallacy. Astounding as it may appear, I can vouch for the fact that mine was once driven a whole day by a friend with the crank case drain tap fully open through an oversight. The only fault he found on returning it was that it did not seem to take so much air; when I pointed it out to him, he declared that there was practically no difference in the running or power from the time he had previously borrowed it.

The most extraordinary experience I had was when finding the platinum points almost gone I tried to fix two new points which I had by me. After about 100 miles the engine began to misfire occasionally; examination proved that one point had dropped off, and thus the other did not meet the arm, from which it had dropped by about  $\frac{1}{16}$  in. It still fired fairly regularly and took me home all right. Can any of your readers explain either of these last two experiences? Finally, if lubricated properly—not petrol—decarbonisation is not necessary under 800 to 900 miles, and can be easily made a good job of in an hour. I am certain that a good modern two-stroke is the most reliable and fool-proof motor cycle made.

ROYLAT.

Ipswich.



**A BOARD OF TRADE ANNOUNCEMENT.**

Sir,—I notice in your issue of *The Motor Cycle* of June 28th, under the heading of "Current Chat," a paragraph headed "A Board of Trade Announcement," in which is stated, "The Board of Trade is compiling a directory of *British and Irish manufacturers*." Surely Ireland is British? Do not the British Isles comprise Great Britain and Ireland? I would not mind if you had put "British and South Irish." Pembroke.

A BELFAST MAN.

[Our correspondent, with whose views we sympathise, must not blame us, but the Board of Trade. We used the words contained in its announcement.—Ed.]

**SPARKING PLUG DESIGN.**

Sir,—May I encroach upon your valuable space in reply to "H.B.," re the "Four-point Plug," which, although a good plug in other respects, soots up rapidly? As anyone with quite an elementary knowledge of the multiplication table would admit,  $4 \times 1$  cannot by any mathematical jugglery resolve itself into anything but 4. With regard to your correspondent's electrical theories, I should advise him to attend an elementary class in "electricity" before rushing into print with such obvious errors, as I am afraid that the manual referred to by him in your issue of June 21st is considerably out of his depth. Granted his contention about increase of resistance, did he ever contemplate that, although another drop in an ocean makes it larger, the proportion would turn his hair grey if he attempted to work it out? The "elongation" suggestion by Mr. A. Ward certainly more than counteracts the increase of resistance; but, after all, what "splitting of hairs." R. C. FORDHAM.

Instructor of Electrical Engineering L.C.C.

**ALUMINIUM CYLINDERS.**

Sir,—I notice your evident enthusiasm for aluminium as a cooling medium when applied to the cylinder of an internal combustion engine either in the form of a jacket or cast upon the iron cylinder.

The heat conductivity of aluminium is not disputed for an instant. The conductivity of aluminium in this respect is second only to copper, which has the highest heat (and consequently electrical) conductivity known. I have carefully read all your articles on the subject, and in none of them do I find any mention of the one great factor which will upset all your calculations, and render the aluminium jacket a failure in the hands of any but the most expert and careful of drivers. In other words, it is not "fool-proof," and for the following obvious reason, *i.e.*, *low melting point*.

There is scarcely a motor cyclist of over five years' experience who, at some time or other, particularly at dusk (when the phenomenon is most apparent), has not, on glancing down at his engine, particularly after mounting a long slope in a following wind, found that engine a dull, nascent red about the combustion chamber; and, moreover, the engine appears to be running well nevertheless. A glance at a table of melting points of various metals (to be found in any engineers' pocketbook) will show the melting point of ordinary commercial aluminium alloy (as used for crank cases, etc.) to be  $1,200^{\circ}$  Fahr., or only double the melting point of common lead ( $600^{\circ}$  Fahr.) So low, in fact, is the melting point of aluminium that it can be used successfully for "die casting"—an operation that can only be performed with metals of low melting point, such as alloys of zinc and tin, zinc and lead, etc., with sometimes an admixture of a little aluminium.

Glancing once again at our engineers' pocketbook, we find the temperature of a "dull sombre red" to be  $1,290^{\circ}$  Fahr. (Pouillet). Therefore, should an unfortunate or careless driver allow his engine to become a dull red on some summer evening, he will, on looking down to ascertain the cause of a sudden "seize up," find his beautiful aluminium *non est*; and, retracing his footsteps, he will discover various blobs of metal on the roadway that were once his fins.

It will, of course, at once be argued that with aluminium fins the engine could not possibly get as hot as a dull red, therefore the contingency will never arise. It depends on the driving, gentle reader. Some drivers will boil the water in the most ultra-efficient of modern cars, let alone melt aluminium fins off a cast-iron cylinder (when running on paraffin in these troublous days).

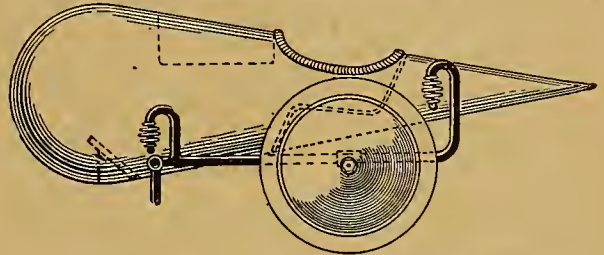
Finally, the whole idea is as old as the automobile industry. And had there been any real and lasting advantage in aluminium radiating gills, or had the commercial production

of the same been at all practicable, it is safe to assume that almost all air-cooled engines would have been so fitted. Success attended Lanchester's early air-cooled cars fitted with copper radiating gills, but commercial considerations caused the company to abandon the practice. It is extremely doubtful whether any juggling with various metals of varying heat conductivity, attempts at "oil-cooling," etc., etc., and other ingenious attempts to render air-cooling at all effective, will ever come within measurable distance (for real, right-down solid efficiency) of the most successful of all methods of cooling, *i.e.*, water-cooling.

E. V. HAMMOND, M.E.

**SIDECAR CONSTRUCTION.**

Sir,—I read in *The Motor Cycle* last week a remark on "streamline" sporting sidecars. I thought over the idea some time ago, and I drew out a number of designs, but none of them seemed to be easy to build (in theory). At last I hit on the idea of using either aeroplane construction for lightness or metal (pressed) for strength. The aero construction, wood and canvas, would be A1 for speed



The type of sidecar offering the least possible air resistance (and incidentally the least disturbance of dust) is of perfect streamline formation.

work on a track. "Swan" springing could be used and a simple frame in a sidecar of this type.

To take all the strain off the front of the motor cycle frame, the passenger would be seated slightly behind the sidecar axle, because the large front end of the sidecar would balance the passenger.

I am always interested in the discussions of "The Critics."

H. A. ROWE.

**REMINISCENT.**

Sir,—The photograph of Fountains Abbey (on page 593 of *The Motor Cycle* for 28th June, 1917) recalls two historical incidents which happened at this exact spot. Here, just opposite Robin Hood's Well (on left side of path), that forest freebooter bold Robin Hood and Friar Tuck carried each other backwards and forwards across the little stream. The hill shown in the picture, behind the figure reclining on the grass, is a gentle rise in the path, which encircles the ground, was the scene of the first bicycle hill-climb. This took place on the 26th of June, 1869, and I witnessed it "from within the ropes." There was a "great exhibition of bicycles and tricycles . . . with races." The machines were displayed in front of the Abbey (a reprint of the picture would be interesting). Wonderful and beautiful I thought the "boneshakers." Of course; there was not a wire wheel amongst them. I remember the details of that never-to-be-forgotten afternoon as clearly as if they took place less than forty-eight weeks ago instead of as many years. I was an inquisitive schoolboy at the time, and, seeing a knot of officials at the top of the slope, crossed the river at the top of the "falls" (see photograph), and joined them. I discovered that a special prize had been offered to anyone who could "ride up the slope" during the race round the grounds. Several reserved themselves for the effort. One got within a few yards of the top, then fell off. It was the first cycle (that word was not invented till quite fifteen or sixteen years later) race meeting I ever saw.

On the same afternoon the first bicycle race ever held in the City of London took place on the H.A.C. ground.

By the way, your contributor did not mention "the surprise" view of the Abbey. Visitors are taken through the grounds, upward and upward, but no sign of the ruins. Then they are assembled before a large double door. This is suddenly flung wide open, and "the most enchanting peep in all England" is before them. H. HEWITT GRIFFIN:



## INFLATION.

NOTES FOR THE TYRO  
ON THE PRESERVATION  
OF TYRES.

THE use or abuse of the foot pump is a matter with which the knights of our correspondence pages were recently juggling. Should I inflate my tyres board hard, semi-hard, or on the slack side, are the points discussed. Most correspondents seem to vote for the semi-hard degree of inflation, but surely something depends on the size of the tyres used and the weight of the rider and the machine. It also depends whether one measures hardness from the pedal cyclist or the motor car owner's point of view. Those enviably careful souls who always take their baths at one carefully measured temperature, probably inflate their tyres by the guidance of a pressure gauge, but the average motorist finds the toe of his boot, lustily applied, a good enough gauge. Therefore it would not be of much use setting forth the exact pressures (even if I knew them) to which motor cycle tyres should be inflated, and, moreover, this point depends on so many deciding factors that such a table might be only misleading. It is largely a matter of personal taste and judgment.

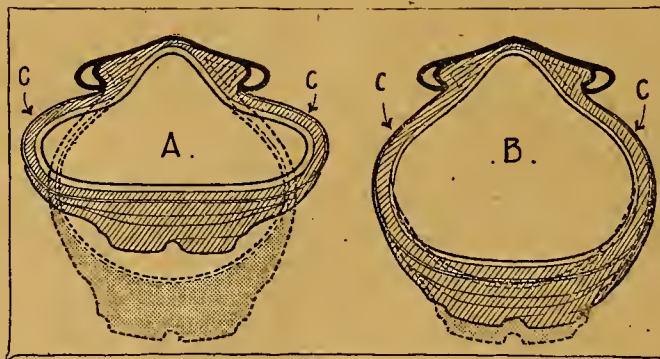
**Lightweight Tyres.**

During a wonderful assortment of riding on various machines—some, indeed, wonderful!—I have come to the following decisions on the subject: In the case of a lightweight having 24in. wheels, the tyres should be inflated just so hard that the rim does not bump on mounting at 20 m.p.h. stone setts which stand 3/4in. or thereabouts higher than the macadam, and no harder. In other words, do not pump the tyres any harder than is absolutely necessary to avoid rim contact, which should be "just impossible," and no more than just impossible. If 24in. wheels be ridden with the tyres harder than this, the discomfort and the general depreciation more than make up for the very slightly increased life of the tyre. This is especially the case on the war-worn roads which are only too common all over the country at the present time.

**General Depreciation.**

One correspondent very sensibly dwells upon this point of general depreciation caused by the jarring

effect of bone-hard tyres. It is an important point. The manufacturers of tyres, very sensibly and laudably, being anxious that their goods should give maximum wear, encourage riders to keep their tyres board hard, which is, of course, good for the tyre, since its walls are then subjected to much less bending strain, as the tread comes in contact with the road, than if the tyre were on the slack side. A slack tyre fluctuates with each revolution over the range of movement shown in sketch A, whereas a hard tyre moves only so far as is shown in B, therefore the wear at the points C is much greater in the case of the slack tyre than in the case of the bone-hard. This wear is communicated to the beading, which may split at an early date if the tyre be ridden too slack, and, moreover, if high speeds are indulged in, the constant depression and rebound of the slack tyre is apt to generate heat, and also movement of the inner tube, which may spell the destruction of old patches.



The relative strain imposed on the walls of a tyre loosely inflated and on one of normal hardness. It will be clearly seen that persistent under-inflation must soon damage both the wall and beading.

**General Rules.**

The rider of wide experience will invariably tell you that the degree of inflation at which he runs his tyres depends on what he is out for. If he is out for a gold medal in a strenuous six days' trial he runs his tyres almost (but not quite) board hard, and if out for pleasure he runs them at least 5° slacker. Running the tyres board hard may be good for the tyres, but it is wrong in every other respect. If a tyre be run in this condition it defeats its own aim—that of making up the inequalities of the road surface, and if it be found that a certain make of tyre persistently gives at the bead when ridden at a comfortable tension, then one's best plan is to eschew that make in future and try something fresh. Some makes of tyres, too, are apt to roll unless pumped up very hard, especially in the larger sizes. This gives a sense of insecurity to a motor cycle which is most unpleasant.

By riding one's tyres on the slack side the transmission and engine are relieved of many nerve-racking shocks, while one's comfort is enormously increased. A security valve is, of course, necessary.

B.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## Changing Gear on P. and M.

**Q.** What is the proper way to change gear on a P. and M.? Should the exhaust valve be lifted, or should the engine be slowed down with the control levers only?—E.K.

We have found the best way to change gear on the P. and M. is as follows: When changing up, lift exhaust valve at the same time as the gear lever is shifted, planting the lever well home with a sharp movement; drop exhaust instantly the gear is in. In changing down, keep the throttle open. Jerk lever from top gear position into neutral, allow the engine a brief interval in which to gain speed (not to race), and pull the lever up into the low gear position.

## Two-stroke Lubrication.

**Q.** I have a New Hudson two-stroke machine, and I am troubled with oil on the top of the cylinder. I have had cylinder head off, and find there is no gauze over the port hole. Should there be one in this machine? Also can you explain the reason of the following: It will run all right on low gear, and two-strokes splendidly, but as soon as the high gear is engaged it starts four-stroking, and gradually gives up entirely. Magneto is in good order, and the carburetter is a B. and B. automatic. Everything seems all right.—A.B.

No, the transfer ports of the New Hudson are not provided with gauzes.

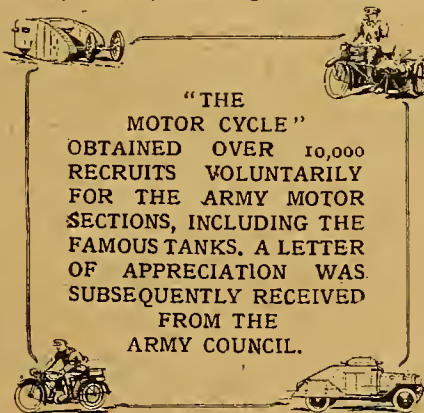
You say you are troubled with "oil on the top of the cylinder," so from this it would appear that you mean externally. Evidently the oil comes from the decompressor. If you mean that you are troubled with oil in the combustion head, causing sparking plug troubles, etc., it is evident that you are over-oiling, and we should advise you to cut down the supply slightly. A transfer gauze does not prevent oil gaining the combustion space, but is merely to eliminate the likelihood of explosion in the crank case.

It is evident that your carburetter is fitted with too large a jet, and that the mixture is too rich except when the engine is running at high speed. You will have to ascertain the best size of jet by experiment on the road. We should say a 26 would be about right. Make sure that there is no air-lock anywhere—that the tank vent is not stopped up, and that petrol is reaching the float chamber easily.

## Wheel Speeds and Explosion Pressures.

**Q.** As an old reader of the "Blue 'Un," I readily turn to you to settle a few points, the result of a technical argument. (1.) Which part of the outer rim of a wheel travels quickest? (2.) Do wheels, running at high speeds, distort and become momentarily oval? I have seen a snapshot in a contemporary of a car travelling at a terrific speed, and the front wheels appear as distinctly oval. Are they distorted? If not, does the fault lie with the focussing of the camera? (3.) What is the pressure per square inch in the cylinders of a 2½ h.p., 3½ h.p., 5.6 h.p., and 7.9 h.p.?—H.T.

(1.) If you refer to a wheel travelling on the ground the top part moves fastest. It is, in fact, travelling at double the



speed of the car. The bottom portion of the wheel is, at the point where it touches the ground, stationary. (2.) No, a wheel does not distort at any speed. In a photograph of a car travelling at high speed the wheels appear distorted, owing to the fact that they have moved a certain distance in a horizontal plane during the exposure, while they have not moved in a vertical direction. The focal plane shutter also has the effect of distorting the image, as the bottom portion of the plate is exposed before the top portion. (3.) The explosion pressures remain approximately the same, whatever the h.p. This is not decided by the capacity of the cylinder, but by the compression ratio and throttle opening. The mean effective pressures are in the vicinity of 90 lb. per square inch, while the maximum explosion pressures lie between 200-300 lb.

## Wear in Carburetter.

**Q.** I have a Villiers two-stroke, with Senspray carburetter. Recently I dismantled the carburetter to clean it, and noticed that I could move the levers some distance before the corresponding parts in carburetter body moved. I tightened the wires, at the same time seeing that both valves shut when levers were in off position. On assembling and trying the machine a mysterious popping back through the carburetter occurred. This happens at all engine speeds if position of levers is suddenly changed, and especially if running slowly and with air shut right off.—D.K.S.

It is evident that one of the slides—probably the air—is not closing properly. The slides may appear to work freely when moved slowly with the engine idle, but the suction of the engine may have the effect of causing one or both of them to bind, entirely upsetting the mixture. It is possible that you will find wear in the barrels or in the carburetter body, and if this is so, it is very difficult to cure, and almost invariably means renewals ere perfect working is restored.

## Hill-climbing and Gear Ratios.

**Q.** I am running my machine on substitute (through a vaporiser) and find it knocks terribly on hills unless I shut off the air completely. (1.) What causes the knock? (2.) What is the maximum gradient that a 6 h.p. Enfield and a.c. in good order should get up on low gear and average load? (3.) What is the maximum speed advisable on low gear on a long hill?—J.R.

(1.) Experts are not agreed on the subject of knocking, but undoubtedly pre-ignition may be one of the causes. Paraffin and petroleum cause knocking more readily because they are ignited at a lower temperature than petrol, and thus pre-ignition is more likely to occur. (2.) The bottom gear of the machine in question is about 8½ to 1, in which case it should be capable of climbing a gradient of 1 in 4 or 1 in 5 with two up. (3.) Presuming that the bottom gear is 8½ to 1, then the speed of the machine with engine revolving at 2,000 revs. per minute would be eighteen miles an hour with 26in. wheels. It would be very inadvisable to exceed this speed on long hills, and on some hills it might even be an advantage to throttle down to twelve or fifteen miles an hour if the climb were exceptionally long.



**Difficult Starting.**

?

I am experiencing difficulty in inducing my  $3\frac{1}{2}$  h.p. Triumph to start. All it will do is to back-fire through the carburetter. I have just ground valves in, removed the carbon from the cylinder head, and cleaned the carburetter, but without any results. I should be pleased if you would give me your expert advice as to what may be the cause of the trouble. Do you think that having run on substitute has put any of the parts out of order? The magneto is apparently all right.—F.D.

It is probable that you have either upset the timing, or in reassembling the carburetter you have not taken sufficient care to see that the unions are air-tight. The use of substitute would not cause the trouble of which you complain, unless you have been using something in which there has been a great deal of water or other impurities. Water in the petrol system is, of course, fatal, and it is, moreover, very difficult to remove entirely.

**Crank Case Release.**

?

(1.) I have "Motor Cycles and How to Manage Them," also "Tracing Troubles," but they do not tell me how to economise in lubricating oil, and at the same time keep crank case, etc., clean on my  $2\frac{1}{2}$  h.p. F.N. I think oil is blown out past valve tappets and through bearings by crank case pressure. It seems to me that the little ball valve fitted is not half big enough for a crank case release. I should be glad to have your opinion. What is the objection to having a large breathing opening? On this engine it is on the top of crank case, between the valves. How would 2in. or 3in. of open tubing serve instead of the little valve, that seems to close just when it should remain open?

(2.) I have been troubled with strange misfiring after running ten miles; and sometimes after only two miles of fast running the engine begins to misfire, and gradually comes to a standstill. When misfiring begins, it gets rapidly worse on opening the throttle wider, and ceases if throttle is slightly closed.—C.M.

(1.) We do not think it would upset the running of the engine to experiment by fitting a breather pipe to the crank case; but if you do so, we would recommend you to carry it up to a good height, say about 4in., and bend it over at the top, so that any oil blown out would drop on to the ground. The crank case release valve does not need to be very large, as its object is to let air out and prevent fresh from entering, thus maintaining a partial vacuum in the crank case. We do not think you would really gain anything by trying to improve on the present release, taking it that the latter is working properly, and not choked with dirty oil. Your loss of lubrication is evidently due to wear in the tappet guides, etc.

(2.) As the misfiring occurs when throttle is open, it rather points to the fact that under full compression the spark does not jump the points of the plug. We should recommend you to try a new sparking plug, and to examine carefully the magneto and all electrical connections.

**A Mysterious Pulling Up.**

?

(1.) I have a  $2\frac{1}{4}$  h.p. Levis, fixed gear, with which I find this peculiarity. I start it off (it starts very easily), and, after going, say, four or five miles at a good speed, it suddenly pulls up, and, on dismounting and flooding the carburetter, it goes off for another distance, when the performance is repeated. The other day while out on this machine, as it slowed down preparatory to stopping in the usual manner, I happened to lift the exhaust, whereupon the engine blew back in the carburetter and immediately started again. I have since adopted the same plan, and it invariably sets things right. (2.) The engine will always misfire at irregular intervals, perhaps going a mile or so without, then starting again for twenty or thirty yards. Will you please give me your opinion on this?—R.E.B.

(1.) Try a smaller jet; also make sure that there is no air lock in the petrol pipe, and that air is permitted to enter the top of the tank *via* the stopper vent. Next time your machine begins to pull up, turn off the petrol and stop; then see if the petrol is at the correct level in the float chamber. If it is low, this will indicate that there is an impediment in the flow. Make sure the cylinder nuts and all the crank case bolts are tight. (2.) Most two-strokes misfire at intervals. The wrong sized jet, too much oil, a dirty engine, a gummed up top ring, or a partially choked transfer gauze (if one be fitted) will cause it.

**Damages and Garage Hand.**

?

I had a slight adjustment attended to at the local garage by the mechanic who was on the premises. The machine was a  $2\frac{3}{4}$  h.p. Douglas, and afterwards I asked the man to try the machine to see if anything else were wrong, as I had a long journey to go early on the following Monday morning. He did so, and collided with a wall in the yard, causing damage to the extent of £4 or £5. I at once saw his employer, who came and saw the damage, and he said the man was not in his employ after 6 p.m. The accident happened about 8.30 p.m. The employer therefore said he was not responsible, and the man and I must settle. The man said (in the presence of two witnesses) that he would get the repairs done. Since then I have received a letter from him saying he will, if I give him £2 towards the £4 which it will cost, proceed with the repairs. Feeling sorry for him I offered to help him to the extent of £1, as it has cost me very much more in train fares, loss of time, etc. He has again written me, and says he finds that he is not at all liable and will not do anything unless I pay half (£2). His argument is that I asked him to try the machine. Is he liable or am I?—F.A.C.

To succeed against the man himself you would have to show that the damage occurred through the negligent way in which he rode the machine. There ought not to be much difficulty about this, as the man was a mechanic and apparently

knew something about the machine. To succeed against the employer you would have to show, in addition to the above, that what the man was doing was within the scope of his employment; for instance, if it were not part of his duties to ride the machine to see if there were anything wrong the master would not be liable. Moreover, if the employer can substantiate his point that the man had no business on the premises after 6 p.m. it would be difficult to recover against the employer. From the letter it would appear that the man is liable for the whole of the damage.

**READER'S REPLY.****Dirt in Carburetter.**

I am interested in the difficulty of "Novice" in your issue of July 5th, as I had a similar experience with my  $2\frac{1}{4}$  h.p. Calthorpe. I think that if he follows your advice he will eventually trace the trouble. In my case the cause of the trouble was a small piece of solder which moved about in the tank. It was not sufficiently large to choke up the petrol flow to the carburetter entirely. When the machine was stationary it was an easy matter to flood the carburetter, and this put me off the scent for a considerable time. The mystery was ultimately solved when I undid the petrol supply pipe and discovered the obstruction almost covering the hole at the bottom of the tank. The suction of the engine once the machine was going would gradually draw the solder towards the top of the petrol supply pipe, and the inevitable stoppage would occur. It was an irritating bit of trouble, but apart from this I have found that my machine is of the utmost service to me and thoroughly reliable.—D. J. B. LEWIS.

**RECOMMENDED ROUTES.****MANCHESTER TO ABERYSTWYTH.—H.W.**

Manchester, Altrincham, Chester, Wrexham, Ruabon, Oswestry, Welshpool, Newtown, Llanidloes, Llangurig, Dyffryn Castell, Aberystwyth.

**ABERYSTWYTH TO DERBY.—H.W.**

Aberystwyth, Newtown, Montgomery, Westbury, Shrewsbury, Newport, Stafford, Weston, Uttoxeter, Derby.

**REDDITCH TO SKEGNESS.—V.F.B.**

Redditch, Alcester, Stratford-on-Avon, Warwick, Leamington, Rugby, Market Harborough, Weldon, Stamford, Market Deeping, Spalding, Boston, Wainfleet, Skegness.

**PRESTON TO MERTHYR TYDVIL.—P.S.**

Preston, Wigan, Warrington, Tarporley, Whitechurch, Wem, Shrewsbury, Church Stretton, Ludlow, Leominster, Willersley, Hay, Three Cocks Junction, Brecon, Merthyr Tydvil.

**BIRMINGHAM TO ILFRACOMBE.—H.W.C.**

Birmingham, Alcester, Evesham, Teddington, Cheltenham, Stroud, Nailsworth, Dunkirk, Bath, Marksbury, Chewton Mendip, Wells, Glastonbury, Othry, Durston, Taunton, Milverton, Bampton, South Molton, Barnstaple, Ilfracombe. Approximately 200 miles.

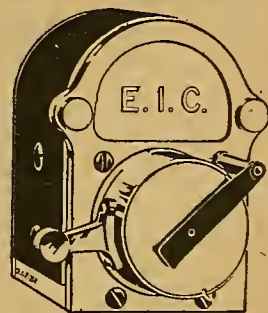


# ABOUT MAGNETOS

Magnetos, to be satisfactory, must be manufactured on such lines as shall ensure absolute concentration of effort on every component part.

E.I.C. magnetos, besides being all British, are manufactured in such manner as to ensure the necessary concentration; thus accounting for their extreme reliability and efficiency.

The registered trade mark E.I.C. is to-day recognised throughout the motor cycle world as the mark which guarantees satisfaction on all matters pertaining to magnetos.



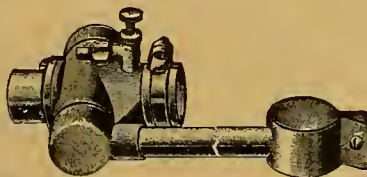
## E.I.C. MAGNETOS LIMITED

SAMPSON ROAD NORTH, BIRMINGHAM.

ON WAR SERVICE.

## The "GRADO" Paraffin Vaporiser

**Motor Cyclists!** here is a device which will enable you to run on paraffin and get results equal to petrol. It is designed by a practical engineer, and has been well tested. It fits between the engine and carburetter, and is connected to the silencer pipe by the clip illustrated. An injection of petrol through the tap on top starts your engine. Paraffin then does the work.



PATENT No. 13113.

*It is just what you require to-day.*

The price, all complete, is

**35/-**

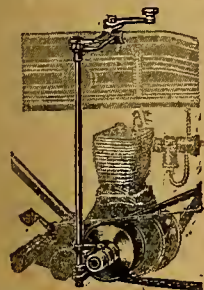
POSTAGE 6d. EXTRA.

Delivery from stock. Order now, stating the outside size of inlet pipe.

## The "GRADO" Multi-Pulley.

PATENT No. 27485/13 and 6612/14.

Is simple in construction. Nothing to go wrong. Fits any standard belt-driven machine. Just half a turn of the handle changes from top gear to free engine. So simple.



Pulley fitted to machine.

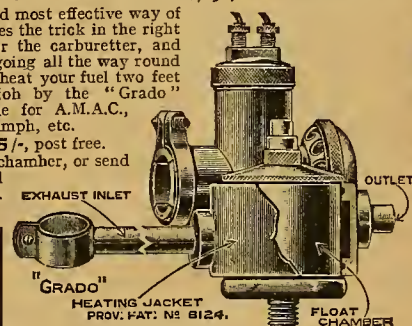
Starts you like a car. The low gear gets you through traffic. The high gear saves fuel and gives you speed. The middle gears are there when you want them. The price, complete, for Triumphs, Bradburys, etc., is £3 3 0. Ball-thrust model, which we recommend, £4 0 0. Light-weight models from £2 10 0. Recessed Pulleys, 10/- extra. Postage, 2/- extra. Delivery from stock. Write for catalogue.

## THIS IS THE NEW MODEL The "GRADO" Heating Jacket.

PROV. PATENT No. 8124/1917.

This is the simplest and most effective way of heating the fuel. It does the trick in the right place. Simply fits over the carburetter, and allows of hot exhaust going all the way round it. There is no need to heat your fuel two feet away. Do it on the job by the "Grado" Heating Jacket. Made for A.M.A.C., Senspray, B. & B., Triumph, etc.

Price, complete, is 15/-, post free. State diameter of float chamber, or send carburetter and we will return with one fitted. Order to-day!



**GRADO MANFG. CO.,**  
Pershore Street, BIRMINGHAM.

*In answering these advertisements it is desirable to mention "The Motor Cycle."*



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILLIFFE & SONS Ltd., and crossed** & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Illiffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**A** BINGDON King Dick, late 1914 combination, 5-6 h.p., 3-speed, Gloria sidecar, excellent condition; £58.—Griffin, 89, Gt. Portland St., W.1. [4761]

**A** BINGDON, 3½ h.p., single-speed, adjustable pulley, Bosch mag., pan seat saddle; £28; E.P. or exchange.—Service Co., 292, High Holborn, London. [5563]

**1914** Abingdon King Dick, 5 h.p. twin, Capolet sidecar, Armstrong gear, 3 lamps, tools, spares, 1¼ Dunlop spare belt unused, 650 steel-studded tyres, Binks carburettor; £50, offers.—McNaught, Quea St., Castle Douglas. [5302]

### A.J.S.

**1916** A.J.S., 3 speeds, in fine order, and complete; £50.—Cross, Agent, Botherham. [X2651]

**A** J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

**A** J.S., 1914 (May), 6 h.p., and Millford Empress sidecar, Lucas accessories, and many spares; £60.—Whitehead, 12, Pine Grove, Prestwich. [5462]

**A** J.S., 1915, 2½ h.p., 3-speed, clutch, T.T. hars, P. and H. head lamp, generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.1. [4203]

**A** J.S., late 1913, 6-7 h.p., 3-speed countershaft, clutch, kick start, 3 lamps, generator, horn, speedometer, coachbuilt sidecar, in splendid condition; 50 gns.; owner bought car.—245, Mitcham Lane, Streatham, S.W. [5298]

**A20** All letters relating to advertisements should quote the number at the end of each advertisement, and the date of the issue.

# FASTENER FAILURES

never inconvenience the careful man—he avoids them!

There's a simple way and it's no secret—just insist on having "the fastener that never fails"—one of the Forward Range.

Pay your own price, and secure a "never-failing" value.

Ask us for Catalogue.

The **FORWARD** .. 1/6.  
Leather-covered **LINK** .. 1/-

The **KING HOOK.**

Detach. 1/- Adjust. 1/3.

The **CHAMPION.**

Detach. 9d. Adjust. 1/-

**FORWARD MOTOR CO.,**

35, Forward Works,  
Summer Row,  
**BIRMINGHAM.**

# NEVER KNOW THEM WITH A FORWARD

## IGNITION and Car Lighting Experts.

Our Service combines thorough knowledge—best materials—perfect fitting—prompt attention—quick despatch—moderate charges.

In one word—**THOROUGH**

Write, Wire, or Phone—  
**W. MOORE & CO.,** Magneto & Car Lighting Specialists.  
14, Cannon St., Manchester.  
Telephone and Telegrams—2448 City.

# Photography

Every Wednesday. Twopence.

## IMPORTANT NOTICE.

Owing to the August Holidays, the issue of "The Motor Cycle" for August 9th must be closed for press earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, August 2nd.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**2½ h.p.** A.J.S., 1913, 3-speed model, hand-controlled clutch and kick start, mechanically fit, small machine, fitted with a complete set of Lucas accessories; £45; guaranteed.—Wauchope's, 9, Shoe Lane, London. [5339]

### Alldays.

**RIDER TROWARD** and Co., Hampstead.—1911 Alldays Allon, 2-speed; 29 gns. [551]

**COLMORE** Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [X079]

**RIDER TROWARD'S**, 78, High St., Hampstead.—1914 Alldays Matchless, 4 h.p., clutch; 19 gns. [552]

**ALLDAYS** Allon, 2-speed, £35; Alldays Allon £32/10; E.P., or exchange.—Service Co., 292, High Holborn, London. [556]

**ALLDAYS** Allon, 1916, 2½ h.p., 2-speed gear, lamp and horn; any trial during week-ends; £29.—Hevi Rd. P.O., Edenbridge, Kent. [522]

**ALLDAYS** Allon, single speed, £36; 2-speed, £42 2-speed and hand clutch, £45; new; E.P. n extra, or exchange.—Service Co., 292, High Holborn London. [557]

**2½** Only Added to £42 for a new Allon, 2-stroke 2-speed model, or gradual payments of 1¼ down and the remainder in 12 equal monthly payments.—Wauchope's, 9, Shoe Lane, Fleet St., London. [5339]

**ALLON** 2½ h.p. 2-stroke Motor Cycle, £38/14, or 0 extended payments terms, deposit £7/14, and 1 monthly payments of £2/13; 2-speed and other model also supplied.—Harrods Stores, Ltd., Motor Cycle Dept Brompton Rd., S.W. [529]

### Antoine.

**ANTOINE**, 3½ h.p. twin, £21, fast, tyres good.—Wheeler, 44, Rutland Rd., Harrow. [548]

### Ariel.

**ARIEL**, 3½ h.p., 1917, 3-speed countershaft model in stock.—Crow Bros., Guildford. [256]

**COLMORE** Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [079]

**ARIEL**, latest 1917 3½ h.p. combination, actually in stock; £93/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [533]

**ARIELS**—3½ h.p., 1917, new, countershaft 3-speed clutch and kick models; delivery from stock 2½ extra for easy terms.—Wauchope's, 9, Shoe Lane London. [5339]

### Auto-Wheels.

**AUTO-WHEEL**, 1914 model, perfect mechanical condition, good tyre; bargain, £7/10.—Advertiser, 156 Gt. Portland St., W. [518]

**G**ENUINE Wall Auto-Wheel, complete, little used splendid condition; £8/10.—Murray's, 37a, Charles St., Hatton Garden, Holborn. [X267]

**1915** B.S.A. Auto-Wheel, new cylinder, piston, connecting rod, chain, tyre; any trial by appointment; bargain, £6/10, near offer.—Stuart, Hatfield Heath, Essex. [537]

**AUTO-WHEEL**, 1916 B.S.A. Model, shock absorber excellent condition, not used 500 miles, 10 gns. another, ordinary model, excellent condition, 8 gns.; two Raleigh cycles for same, 24in. and 26in. frames, £4/11 each.—21, Station Rd., Forest Gate, London, E. [488]

### Bat.

**BAT-J.A.P.** 6 h.p. Twin, 2-speed gear box, free engine clutch, chain drive, kick starter, with coachbuilt sidecar; £45.—Matthews, Pawnbroker, W. Croydon. [5430]

### Blackburne.

**RIDER TROWARD** and Co., 31 and 78, High St. Hampstead.—1912 T.T. Blackburne; 23 gns. [5523]

### Blumfield.

**BLUMFIELD** (late) 5-6 h.p. Twin, mag., new Dunlop tyres; £22/10.—Wandsworth Motor Exchange, Elm St., Wandsworth (Town Station). [5462]

### Bradbury.

**BRADBURY** and Sidecar, wicker, N.S.U. 2-speed gear; £37/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [5567]



## - MOTOR CYCLES FOR SALE.

## Bradbury.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Bradbury, 1912-13 N.S.U. 2-speed and clutch, 19 gns.; Bradbury, 1913, 3-speed, 21 gns.; also sidecar for either, 3 gns. [5518]

## Brough.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Latest 1916 T.T. Brough, Sturmey countershaft gears; 62 gns. [5524]

BROUGH, 3½ h.p., 1915, 2-speed countershaft model, horizontal twin-cyl. engine, fast machine, complete with accessories; £45.—Wauchope's, 9, Shoe Lane, London. [5599]

## B.S.A.

B.S.A. new Models H and K actually in stock; no waiting.—Moss, Wem. [X2604]

MOLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798]

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888]

B.S.A., 1917 Model K., with coachbuilt sidecar, lamps, horn, etc., been driven few hundred miles only; £75.—A. L. Pitts, Redditch. [X2132]

1914 B.S.A., 4½ h.p., 3-speed countershaft, lamps, horn, tools, speedometer, tyres perfect; any trial; £37, lowest.—Adoff, 22, Fort St., Bishopsgate, E.C. [5503]

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1 in. belts, as fitted by makers, 8/6. Post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529]

3½ h.p. B.S.A., 2 speeds, kick starter, chain driven. Canelet sidecar, lamps, horn, etc., perfect; £49.—Spencer, 50, Smithies Lane, Birstall, near Leeds. [X2638]

LATE 1913 B.S.A., clutch model, in excellent condition, complete with all accessories, runs fine on substitutes; any trial; best offer secures.—31, Main Av., York. [X2599]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—B.S.A., 1916, 4½ h.p., all chain drive, 3-speed, as new, 54 gns.; 1913 T.T. 2-speed B.S.A., 29 gns. [5519]

1916 B.S.A., perfect condition, 3-speed, 4½ h.p.; price 48 gns.—Julians, 44, Broad St., Reading. Biggest light car and motor cycle dealer in the South. Phone: 1024. [0911]

1916 B.S.A., 4½ h.p., all chain, and coachbuilt sidecar, with child's seat, lamps, horn, etc., in very nice condition; £65.—Elee and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492]

4½ h.p. 1916 B.S.A., all-chain drive model, 3-speed countershaft gear, kick starter, with accessories, 50 gns., if fitted with new Canelet sidecar, £17/10 extra; also 3½ h.p. B.S.A., 2-speed model, complete with accessories, £31/10; guaranteed.—Wauchope's, 9, Shoe Lane, Fleet St., London. [5400]

## Calthorpe.

MOLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

CALTHORPE, 2-stroke, late 1915, 2-speed gear, new condition; £25.—W. Dillingham, Arthur St., Anpithill. [X2631]

CALTHORPE Motor Cycles.—All models in stock for immediate delivery.—P. J. Evans, 87-91, John Bright St., Birmingham. [X2659]

CALTHORPE-PRECISION, 1915, 2½ h.p., Enfield countershaft 2-speed gear; £26/10.—Motor Exchange, Horton St., Halifax. [5582]

1916 Completely Equipped 4 h.p. Calthorpe Twin Combination, perfect condition; any trial; £55.—Simpson, Penton Hook, Staines. [X2563]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 Calthorpe-Jap, Enfield 2-speed gear, and clutch, perfect; 25 gns. [5525]

CALTHORPE 2-stroke, 1917, latest model, Enfield 2-speed; 33 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [5528]

CALTHORPE-J.A.P., 2½ h.p., Enfield 2-speed, Senspray carburettor; £29/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [5565]

CALTHORPE-J.A.P., 1917, latest model, brand new, Enfield 2-speed in stock; 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [5527]

1917 New Calthorpe-Jap's, fitted with the latest 2½ h.p. J.A.P. engines, Enfield 2-speed gear; £39/16, extended payments 2% extra.—Wauchope's, 9, Shoe Lane, London. [5401]

1916 Calthorpe, 4 h.p. twin J.A.P., lightweight C.B. combination, Enfield gear and clutch, handle starter, 3 Lucas lamps, generator, and horn, spare valves, rings, chain, etc., machine in new condition, mechanically perfect, with 10 gallons petrol; £55.—175, Stockwell Rd., Brixton, S.W. [5307]

## Centaur.

3½ h.p. Centaur, wicker sidecar, adjustable pulley, 32 Druids, C.A.V., B.B.; Thursday, Sunday by appointment; £19.—73, Falkland Rd., Hornsey, N.8. [5246]

## Chater-Jap.

FOR Sale, 8-10 h.p. Chater-Jap, 3 speeds, chain drive, free engine, Jones speedometer, and coachbuilt sidecar, very fast; £42/10.—Thompson, Cinema Royal, Epsom, Surrey. [5431]

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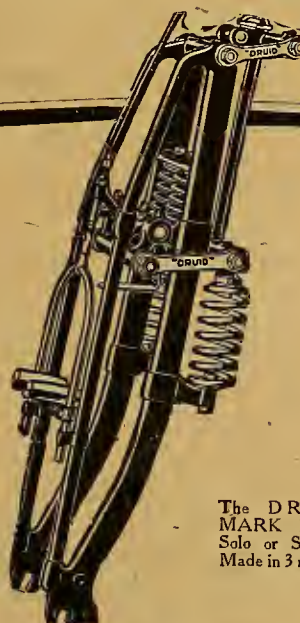
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## MOTOR CYCLES FOR SALE.

## Chater-Lea.

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## Chater-Lea-Jap.

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—1912 Chater-Lea-Jap, 8 h.p., 3-speed countershaft, underslung coach sidecar; 32 gas. [5527]

## Clyno.

CLYNO 1915 6 h.p. Coach Combination, detachable and spare wheels; £72/10.—Motor Exchange, Horton St., Halifax. [5381]

CLYNO, 1915 model, sporting machine, 3½ h.p., mag., beauty; £21/10.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Towla Station). [5466]

CLYNO, 2-strokes, 2 speeds, clutch, late 1914, perfect condition; exchange 1913 2-speed Douglas, or sell £26 cash.—17, Dyers Lane, Putney, S.W. [5356]

CLYNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham and Manchester; inclusive price with spare wheel, 100 gns. [0884]

CLYNO, 1914-15, 6 h.p. engine, kick starter, 3 speeds, with coachbuilt sidecar, a very powerful combination; £65; E.P. or exchange.—Service Co., 292, High Holborn, London. [5570]

CLYNO Combination, 1914, 3 speeds, Millford 2-seater sidecar, all accessories; reason for selling, no convenience; accept £58; exchange lightweight; appointment only.—H., Fernlea, London Rd., Hackbridge, Wallington. [5482]

CLYNO 1913-14 6 h.p. Combination, interchangeable wheels, countershaft 3 speeds, kick start, all enclosed chain drive, No. 6 coachbuilt sidecar, Binks 5-jet carburettor, new spare combination cover, tube, lamps, and horn, spares and tools; exceptional opportunity; accept £47/10; call after 7 p.m.—156, Dalmy Rd., Addiscombe, Croydon. [5358]

## Connaught.

CONNAUGHT, 2½ h.p., 1916, 2-speed, a thoroughly reliable 2-stroke; £29/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [5560]

CONNAUGHT Miniature, single speed, £28/17/6; standard 2-speed, £45/2; new; E.P. no extra, or exchange.—Service Co., 292, High Holborn, London. [5572]

3 h.p. Connaught, 1914, Dunlops, lamps, tools, auxiliary tank, all fine condition, very fast, easy starter; £20, bargain.—F. Smith, 65, Newton Rd., Eastleigh [5320]

CONNAUGHT, 1916, 2-stroke, complete with head lamp, generator, rear lamp, horn, etc., only done small mileage; bargain, £26.—Advertiser, 156, Gt. Portland St., W.1. [4486]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new, 42 gns.; E.P. no extra, or exchange.—Service Co., 292, High Holborn, London. [5573]

COVENTRY Eagles, strongly built, reliable, and attractive machines, fitted with Villiers 2½ h.p. 2-stroke engine, Brompton forks, pan saddle, 2 footbags; £37; extended payment terms, deposit £7/8, and 12 monthly payments of £2/10/7.—Harrods Stores, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [5293]

## Dayton.

1916 Dayton Lightweight, Amac carburettor, Druid forks, tyres unpunctured; £13.—Manners, Bassingthorpe, Grantham. [X2670]

## Dot.

1914 6 h.p. Dot-Jap, new coachbuilt sidecar, speedometer, lamps, spares; 45 gns., or exchange for single (solo) and cash.—Thornitt, North Bar, Banbury. [X2637]

## Douglas.

DOUGLAS, 2½ h.p., 1915, nice condition; £39.—Griffin, 89, Gt. Portland St., W.1. [4762]

DOUGLAS, 1911, 2-speed; £23.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [5279]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, mag., spring forks, nice mount, sound; £15; exchange.—7, Melbourne Grove, E. Dulwich. [5274]

1914 3½ h.p. Douglas Combination, good condition, good tyres; £40.—Ball, Sandilands, Woking. [X2281]

DOUGLAS, 1913, 2½ h.p., 2 speeds, new tyres; £29/10.—Motor Exchange, Horton St., Halifax. [5384]

DOUGLAS, 2-speed, 1913, good condition; nearest offer £30.—A. C. Walker, 90, Elsinore Rd., Forest Hill. [5439]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 T.T. Douglas, 2-speed, perfect; 34 gas. [5520]

DOUGLAS, 4 h.p., lamps, mechanical horn, tools, new tyres, good condition; £32.—Gable, 18, Hyde St., Deptford. [5242]

2½ h.p. 1912 Douglas, £23/10; also a T.T. 2½ h.p. 1913 model, £32/10.—Wauchope's, 9, Shoe Lane, E.C. [5402]



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**DOUGLAS**, prompt delivery to farmers, doctors, and others doing work of National importance.—**Moffat, Yeovil.** Tel.: 50. [5855]

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**8 h.p.** Water-cooled Douglas, late 1913 Williamson combination, good condition; 45 gns.—**Benne and Jenkinson, Andover.** [5451]

**DOUGLAS**, 4 h.p., 2-speed, new condition throughout; £47; seen by appointment.—**Sgt. Woodhouse, Berks. Yeomany, Wivenhoe, Essex.** [5433]

**2 h.p.** Douglas, 1916, 3 speeds, kick start, clutch, new condition, complete; £45; owner joining up.—**Lund, 705, Manchester Rd., Bolton.** [X2591]

**DOUGLAS**, 2 h.p., late 1914, clutch, kick starter, Bosch mag., little used; £37.—**Capt. Saunders, Military Hospital, Warrington, Surrey.** [5313]

**14 Douglas**, 2 h.p., touring model, 2-speed, kick starter, clutch, lamps, and horn, all in tip-top condition; £36.—**J. C. Phipp, Sherston, Malmesbury, Wilts.** [X2625]

**15 Douglas**, 2 h.p., 2-speed, W.O. Model, lamps, horn, speedometer, in very fine condition; £45.—**Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.** [0480]

**15 4 h.p.** Douglas, 3-speed, Colonial Model, Amac, new Dunlop back, £50, or exchange Enfield 1916 combination.—**Call 94, Hoppers Rd., Winchmore Hill, N.21.** [5422]

**15 2 h.p.** Model U Douglas, 3-speed, footboards, C.A.V. mag., upturned or semi-T.T. bars, Dunlops, good condition; £42/10.—**Robinson's Garage, Green St., Cambridge.** [5454]

**DOUGLAS**, 1911, fitted with lamps and tools, £16; Douglas, 1913, 2-speed, Bosch mag., Amac carburettor; £32; E.P. or exchange.—**Service Co., 292, High Holborn, London.** [5580]

**14 Douglas**, 2 h.p., only done 3,000, just thoroughly overhauled and re-emanelled, speedometer, lamps, spares, new oversize tyres; bargain, £35.—**Box 1,070, c/o The Motor Cycle.** [5478]

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## Edmund.

**YOU** Simply Float on an Edmund.—**Gourlay, The Great Douglas Agent, Fallowfield, Manchester.** [8012]

## Enfield.

**ENFIELD** Combinations, latest models; £94/10; delivery from stock.—**Below.**

**ENFIELD** 3 h.p. Twin; £57/10; and 2 h.p. 2-stroke, £45; delivery from stock.—**Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth.** [0838]

**COLMORE** Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801]

**ENFIELD** 1916 6 h.p. Combination; 2-speed; 82 gns.—**785, High Rd., Leytonstone.** [5448]

**ENFIELD** 2 h.p. Twin; £18; A1 order; seen at Farnborough.—**Box 1,060, c/o The Motor Cycle.** [X2571]

**ENFIELD** Coach Combination, 1912, lamps, etc.; £35.—**J. Cosker, 46a, Fairthorne Rd., Charlton, S.E.7.** [5252]

**ENFIELD**, 1917, 3 h.p.; 55 gns.; brand new.—**Wilkins, Simpson, and Co., 11, Hammersmith Rd., London.** [5325]

**ROYAL** Enfield, 1916-17, 2-speed, 3 h.p., kick starter, as new; £49/15; E.P., or exchange.—**Service Co., 292, High Holborn, London.** [5566]

**1916** Enfield Combination, hood, screen, speedometer, etc., in good order; £87/10.—**Motor Exchange, Horton St., Halifax.** [5383]

**ENFIELD** Motor Cycles; immediate delivery all models, with permit to Class A certificate.—**P. J. Evans, 87-91, John Bright St., Birmingham.** [X2660]

**ROYAL** Enfield Combination, late 1914, Binks carburettor, perfect condition, only wants seeing; £50.—**J. Lindfield, High St., Crawley, Sussex.** [5265]

**ENFIELD**, 8 h.p., late 1916, 2-speed, handle starting, speedometer, electric horn, Pilain rest, Lucas electric lighting, luggage carrier, Palmer tyres, coachbuilt sidecar, very handsome combination, unscratched, only done 2,000 miles; bargain, £85.—**Advertiser, 156, Gt. Portland St., W.1.** [5496]

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**ENFIELD** 6 h.p. Combination, 1916, splendid condition, all accessories, very little used; £80.—**Luther James, Hendrie Rd., Llangennech, near Llanelly.** [4887]

**ROYAL** Enfield, 8 h.p., 1913 machine, had little use, with cane sidecar, lamps, speedometer, etc.; £50, no less.—**College, 286, High Rd., Wood Green, N.** [X2705]

**1916** 8 h.p. Enfield Combination, mileage 500, lighting set, speedometer, Stewart horn; 90 gns.; no offers wanted; seen after 5 p.m.—**58, Woodfield Rd., Ealing, W.5.** [506]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—**Enfield combination, late 1916, new, 34 gns.; 1915 3 h.p. twin, 32 gns.; 1916 2-speed, 2-stroke, 29 gns.** [5521]

**ENFIELD** 1915 6 h.p. Combination, used once since June 1916, three new 650 x 65 covers and tubes being fitted; £65, first-class condition.—**Victoria Villa, Wellesley Rd., Clacton.** [X2693]

**ENFIELD** 1917 2-stroke, £44/2, brand new. We are Enfield specialists. Both models in stock; immediate delivery.—**Wilkins, Simpson, and Co., 11, Hammersmith Rd., London.** [5326]

**ROYAL** Enfield 1916-17 3 h.p. Twin, mag., 2 speeds, kick, dynamo lighting, as new; 45 gns.; exchanges entertained.—**Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station).** [5467]

**NEW** Enfield, 2 h.p., 2-stroke, 1917 model, 2-speed gear, chain drive transmission; £44/2 cash, or 2% extra for easy terms.—**Wanchope's, 9, Shoe Lane, London.** Phone: 5777 Holborn. [5405]

**6 h.p.** Enfield Combination, 1915-16, guaranteed perfect condition, Lucas lighting, speedometer, spare chain, tools, etc.; any expert examination; £70, a bargain.—**Apply, E. Langdon, Exmouth, Devon.** [5183]

**ENFIELD** 1914 3 h.p. Twin, 2-speed, kick starter, accessories, spares, petrol, and 20 gallons good substitute, fast, economical, perfect condition, little used; trial; £35, no offers.—**98, Tulse Hill, S.W.2.** [X2620]

**ENFIELD** 6 h.p. Combination, handsome coachbuilt sidecar, speedometer, and all the best accessories, very powerful twin-cyl. engine, with tools to complete, 70 gns.; also another combination, same make, 6 h.p. twin, and sidecar, 60 gns.; both machines guaranteed mechanically fit, and smart appearance.—**Wruchope's, 8, Shoe Lane, London.** [5403]

**ENFIELD**—We have actually in stock on the premises 1917 2 h.p., 2-stroke, 2-speed, £44/2; also 1917 combination, standard model, S.H., with accessories, £89/10; also 1913 coach 4 h.p., and another combination, like new, 1917, 50; easy payments or exchanges.—**Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green.** [5535]

## Excelsior.

**EXCELSIOR**, good old X; delivery from stock.—**The Premier Motor Co.**

**STANDARD** Model, 7 h.p., 3-speed, £75; De Luxe Model, with dynamo lighting outfit and speedometer, £85.—**The Premier Motor Co.**

**SPECIAL** Sidecars for above, enamelled to match, 28 x 3 in. tyre, etc., £15 and £19; liberal exchanges, trial run.—**The Premier Motor Co., Aston Rd., Birmingham.** [5373]

**EXCELSIORS**—All models in stock; magneto model £75, electric lighting model £85; get a big X. You'll be satisfied.—**Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester.** [X1462]

## Forward.

**FORWARD**, 2 h.p. twin; £22.—**W. and H. Motor Co., Ltd., 287, Deansgate, Manchester.** [5280]

## F.N.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—**1913 F.N., 2 h.p., 2-speed, clutch; 16 gns.** [5522]

**F.N.**, 4-cyl., genuine late 1913 model, 2-speed, hand clutch, electric lighting, Lucas horn, new tubes and tyres, cylinders recently rebored, fast and powerful, guaranteed mechanically perfect; further particulars stamped envelope; exchanges; set £30.—**Box 1,069, c/o The Motor Cycle.** [5345]

## Hamilton.

**1913** 4 h.p. Hamilton, 2-speed, F.E.K., C.A.V. mag., B. and B. Dunlops, Saxon fork, good powerful machine; £25.—**Gill, Fold Farm, Grindleford, Derby.** [5480]

## Harley-Davidson.

**NEW** 1917 Harley-Davidsons in stock; only one of each model left.—**Below.**

**1916** 7 h.p. Electric Harley-Davidson Combination, in perfect order and condition throughout; £89.—**Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3.** [0551]

**RIDER TROWARD'S**, 31 and 78, High St., Hampstead.—**1915 Harley-Davidson standard combination; 65 gns.** [5528]

**HARLEY-DAVIDSON** Combination, 1915, Bosch, electric lighting set, many spares; £65, nearest.—**31, Gible St., Wolverhampton.** [X2627]

**COLMORE** Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802]



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## The Hottest Part of an Engine.

ON another page we print extracts from a most interesting and instructive article which appeared in *The Autocar* of July 14th entitled "The Hot Spot on the Piston." The subject of piston cooling has been considered in our pages on more than one occasion recently—in fact, it formed the subject of an article in last week's issue. If the piston can be cooled from within by fresh air being constantly taken into the crank case so much the better, but it is obvious that it will be more advantageous to allow the centre of the piston head to remain hot than to cool it by means of the oil which is expected to lubricate the bearings of the engine.

It is not generally realised that as the oil constantly impinges upon the inside of the hot piston head, it becomes very much heated, to the great detriment of its lubricating qualities, and a considerable amount is carbonised inside the piston. Some of this carbon drops off into the interior of the engine, and forms with the lubricant a mild abrasive which cannot be good for the bearings. From this we see one good reason for emptying and swilling out the crank case at frequent intervals.

What heat the piston loses is dissipated almost entirely through the rings and cylinder walls; the air and oil in the crank case was proved by Prof. Bernard Hopkinson, of Cambridge, to have an almost negligible effect—that is to say, the piston was only 2% hotter when deprived of the advantage of these aids. We presume, however, that the experiment was conducted with an engine unprovided with a cooling blast within the crank case. We may infer, therefore, that the disadvantage accruing to the oil from its contact with the piston far outweighs any advantage which the piston may gain from the cooling power of the oil.

Fortunately an engine can run for hours with the centre of the piston head in a state of very considerable heat, and consequently it may be

cut off from the interior of the crank case and contact with the oil by a baffle plate situated just above the gudgeon pin.

Several motor cycle two-stroke engines have pistons designed in this manner, but, curiously enough, the inventors had quite another object in view, viz., increasing the crank case compression, and the great advantage to be gained by keeping the oil from the underside of the piston head seems to have escaped them entirely.

## More Economical Carburetters.

PROBABLY for years to come fuel economy will be a deciding factor in the success or otherwise of any new carburetter design. The present-day carburetter is a peace-time production, in which economy has by no means been ignored, but while petrol was plentiful the miles per gallon were not so important as they are destined to be in the future. A slow tick over, together with rapid and smooth acceleration, were perhaps foremost in the mind of the carburetter inventor, though of course consumption was not neglected.

It has generally been taken as an acknowledged fact, however, that those other properties so highly desirable for the comfortable touring machine must be forfeited, partly or wholly, if abnormal consumption figures are required, but there is no doubt that if the order of things were reversed, if the carburetter inventor started off with the fundamental basis that he must have economy, he might produce something far more economical than he has produced in the past. The problem, then, to be solved would be how to obtain smooth running and the other advantages we have named, in addition. At all events, there is no doubting that an enormous market awaits the truly economical carburetter—even if that extra 20 m.p.g. be obtained at a slight loss of flexibility—and it is to be hoped that the carburetter industry, which has by no means shown itself lacking in initiative in the past, will rise to the occasion without delay.





## A PLEA FOR SIMPLICITY AND LIGHTNESS.

**T**HOUGH much ink has been spilled on this topic, we do not seem to be getting much nearer to our objective, the evolution of a really sporting motor cycle. The trouble seems to be that everyone uses the word "sporting" in a different sense. The selling agent christens all crude and uncomfortable conveyances "sporting turnouts." To manufacturers and their expert riders, "sporting types" suggest T.T.'s, records, and big advts. I submit that "sport" is little concerned with mere speed lust and utility, and has *nothing* to do with trade.

Now sport and sportsmen are as various as life; but all sportsmen distrust the armchair theorist. It may be well, then, to make it clear that the present writer has had an exceptionally varied experience of field sports and sporting games, and has been "useful" at most of them. Though the following theory rather "smells of the lamp," it has been tested in football scrums, on mountain tarns, and on Canadian rivers. It is now recognised that for periods estimated at from four to eight million years before ploughing and sowing, buying and selling, were invented, men with brains like our own fought and courted, hunted and wandered, over the Thames Valley. I submit that "the sportsman" is the primitive river-drift and cave-man's modern representative, that he is the *normal* man, unspoilt by a few thousand years of artificial life.

### The Travel Tools of Primitive Man.

All our sports, then, derive from man's deepest instincts; but with all respect to our D.R.'s (good luck to them), to fishermen, and "sidecarists," it is plain that the "sporting type" of motor cycle is the mount of the modern wanderer—"the man of the open road."

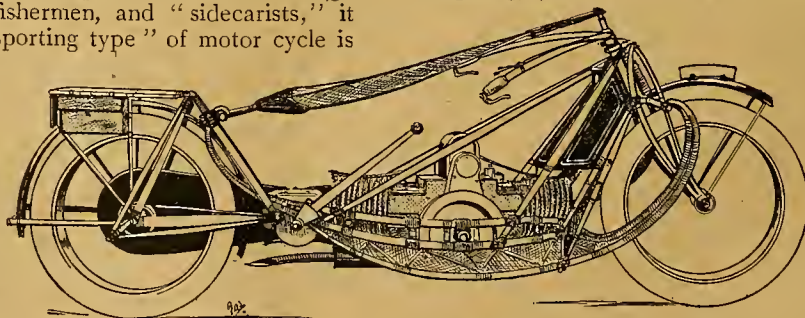
If we want a conveyance which will gratify this deep-seated wander-lust, let us take a glance at the essential points of the "travel tools" of primitive man. An Esquimau kayak (canoe), a sledge, or a pair of snow-shoes, has three common main features. (1.) Skilful design, and the employment of *flexible materials*, achieve a wonderful combination of strength and lightness. (2.) All can be quickly adjusted and repaired, thanks to the choice of material

and simplicity of design. (3.) None of them are designed to be fool-proof, but all respond perfectly to skilful handling. The importance of No. 2 is now recognised, and need not be further insisted on. But No. 3 helps to give a freer hand to the designer of a "sporting type." No. 1 seems, however, so vital that, at the risk of presumption, I venture to urge its importance on seekers for a really sporting motor cycle. Is it essential to cage a large and savage engine in a ponderous frame, and then to add further weight and complication in the form of springs, so as to save rider and conveyance from early dissolution by "road shock," and a kick-starter to get the monster to move?

### Suiting the Means to the End.

Let us go back to primitive and sporting ideas. The sportsman-wanderer desires, as do all sportsmen and primitive folk, a nice adjustment of *means to ends*. Who wants to kill trout on a salmon rod, or shoot pigeons with a 4-bore? Cannot some sportsman-engineer provide us with a small, light, and smooth running *engine* of essentially simple design (e.g., a valveless flat twin two-stroke whose alternately driving cylinders would scavenge and charge each other)? A *transmission* which made a long range of infinitely variable ratios available on direct drive would enable the engine to be run normally at its most efficient rate of revolution, leaving throttle and spark in reserve, and so economise power and weight. Such an engine could safely be housed in a very *light spring* (not sprung) *frame*, i.e., the main frame members could

*themselves* be resilient. The outside flywheel might house the source of both ignition and light. These detailed suggestions of a mere sportsman may seem to the engineer—and probably are—amateurish, but I venture to claim that the *essential*



A motor cycle designed by the author of the article, who strongly advocates the reduction of weight in making what he terms a "sporting" type of mount.

features of primitive travel tools—*strength, lightness, and flexibility*—are the key to the problem of the sporting motor cycle. That this antique "flint arrow" may strike a spark of genius from the steel of some courageous modern designer is the fervent hope of the writer.

A. POTT-HUNTER.



# Occasional Comments by "Ixion"



## Composite Engines.

IT is getting pretty evident that the engine of the future is going to be a hotch-potch of parts made of different metals. I am thinking of the upper half of the engine, for, of course, designers have long enjoyed great freedom of choice below the waist belt. Everything points to aluminium cooling ribs, fitted on to a separate cylinder barrel, possibly of steel, with perhaps an aluminium alloy piston, and certainly overhead valves. Anybody who has handled one of these composite engines will understand that the next crux will relate to the metal of which the cylinder head will be made. Cast iron is the usual medium at present; it weighs a good deal, it gets very hot, it consequently leads to the maximum pitting of the valves, and the most rapid weakening of the springs, and it distorts sadly. What will it be made of eventually? Cast aluminium alloy with iron valve seatings? The clumsiness of these loose heads, as contrasted with the delicate machining of a turned steel cylinder or the low weight of an aluminium cast cylinder, is the point which strikes an observer first and hardest in his comparisons.

## Standardisation in America.

ON June 14th the American motor cycle manufacturers met to consider how far it was possible to meet the demands of the War Department by standardising the parts of motor cycles constructed for war service, and so to reduce the stocks of spares carried at the various army depots, accelerate manufacture, and simplify repair work. The manufacture of motor cycles and of motor cars differ fundamentally in America. There is probably not a motor car chassis made in the States, excepting only the Ford, which does not include components made by some specialist factory, and found also on dozens of cars emanating from other firms. The number of component parts, shared with other cars, drops to perhaps half a dozen in the case of a car built by the thousand, such as the Overland, and rises to hundreds in the case of the smaller concerns. But in the American motor cycle trade, as in our own, the average machine is made from stem to stern in a single works, and includes hardly any standardised parts at all. The meeting finally agreed to standardise the following parts of the W.D. cycles: rims, spokes, tyres, sparking plugs, head light, mountings, magneto bases, chains, controls, clutch pedals, brake pedals, gear shifts, kick-starters, oil and grease cups, oil and fuel pipes, and unions and taps, sidecar connections, and other sidecar fittings. There is not the least reason why a similar standardisation programme should not be devised and carried through in our own trade, and it would enormously simplify problems connected with our export trade when the war is over. Only about three of the above items are as yet properly standardised.

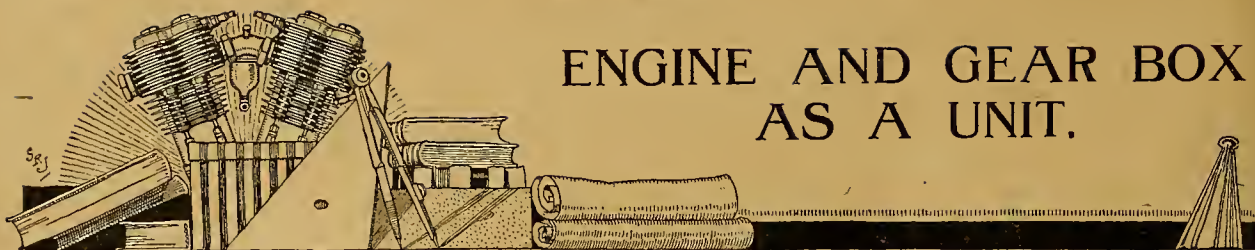
## Oiling a Flat Twin.

CHINOOK'S " remarks on oiling a flat twin only apply to a strange mount, or to a haphazard driver. The ordinary motor cyclist adopts some sort of system with his own mount, and when he puts it away for the night he has so arranged matters that the crank case contains a normal amount of oil, sufficient, let us suppose, for five or six miles. On next starting out he continues to oil according to routine, and the colour of the exhaust does not affect him a whit. As a matter of fact, most flat twins, being distinctly *fin de siècle* machines, have rather more refined oiling systems than the general run of machines; for example, the one which I rode to-day has two oil level taps to the crank case, a maximum and a minimum, as well as a sight glass for the oil feed. Nor have I found in actual practice that the ordinary flat twin is peculiarly apt to smoke when it is first started up. It is true that such oil as its cylinders contain prior to a stoppage is likely to remain there when the machine is at rest; it is equally true that many singles and V twins have oil wells on the top of the crank case, whence any oil drainage is collected by the first dip of the piston on restarting. There are, of course, exceptions in both classes: but taking them in the lump, the flat twin may be treated in this respect just as if it were a single.

## The Dummy Piston Head.

MOTOR cyclists will probably take a special interest in the Hatch patents, discussed in *The Autocar* of July 14th. The notion is that oil is wasted and carbonisation accelerated by the great heat of the piston head, presumably the hottest part of an internal combustion engine. Now there is obviously no reason why oil should ever reach the lower side of the piston head; and if we can prevent this without introducing counterbalancing faults, our oil will keep cooler, we shall get more work out of it, and carbon will form much less slowly. Nobody suffers more from oil wastage and carbon deposits than the motor cyclist, and I hope our post-war engines will prove to be fitted with something on these lines. The carbon deposits inside the piston are the hardest to get rid of, and many owners leave them untouched world without end. It is usually impossible to remove them without taking out the gudgeon pin, a job from which the ordinary amateur is apt to shrink, and not without reason. However, *The Autocar* goes so far as to say that the inside of the piston really acts as a little roasting oven for the oil; that the carbon so formed is mildly abrasive in character, and that it helps to wear down our bearings, besides wasting our oil. The piston of the average baby two-stroke gets extraordinarily crusted with carbon on the inside of its head in a very short time, and if these deposits are allowed to accumulate smooth running is impossible.

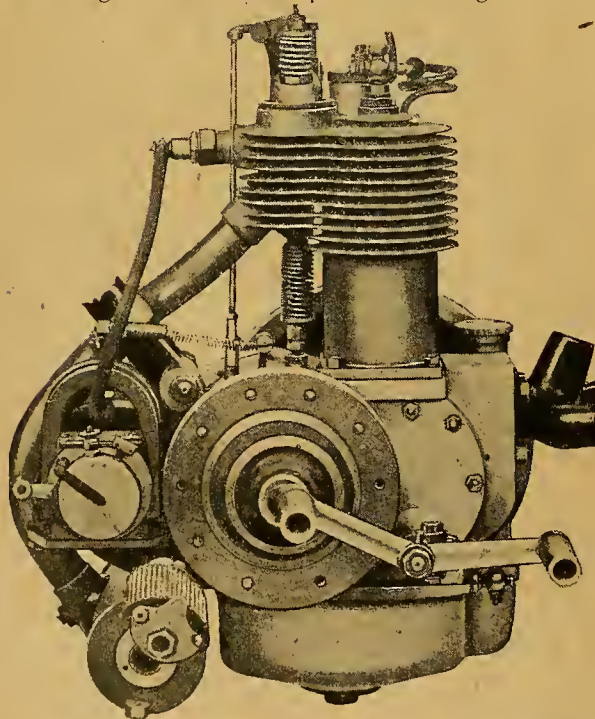




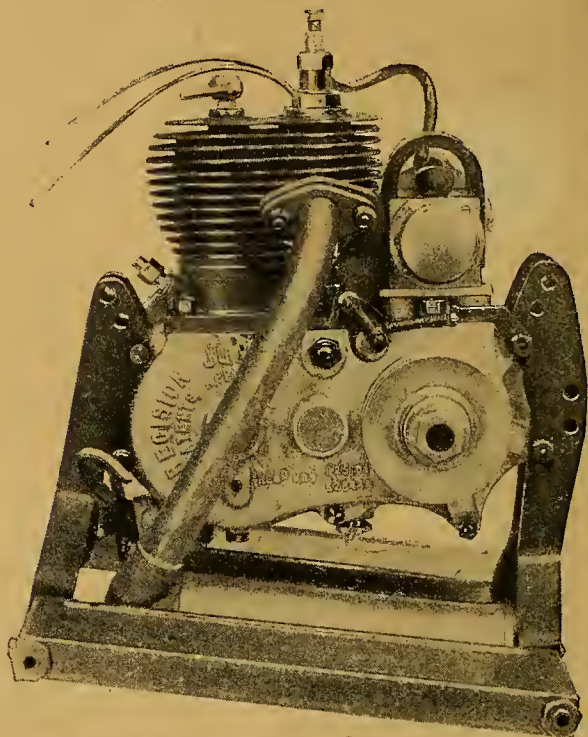
## ENGINE AND GEAR BOX AS A UNIT.

The Pros and Cons for the Unit System of Construction for Motor Cycles, which, when properly applied, has many things to recommend it.

IT is difficult to draw a line between the points at which repetition ends and invention begins, and if the system with which the writer proposes to deal has originated since the birth of the motor cycle, then certainly British engineers originated it. At any rate, we in England were the first to adapt the unit system to motor cycles, but while, in this country, the system has met with little success, it has, in America, marked the whole trend of motor car design, and is quickly creeping into motor cycle practice. The Cleveland and the Henderson are two good examples, and incidentally mark two extremes; I do not necessarily hold up the design of either of these machines as ideal; indeed, certain British units are illustrated herewith which probably surpass them, yet with the exception of one or two lightweights the system is nowhere popularly established over here as it is in the States. Years ago our makers produced designs which



An early Veloce design, in which the makers still retain considerable faith. In many respects the unit was considerably before its time, oil being pump fed under pressure to the main bearings, while the oil sump was integral with the crank case. Note also the outside flywheel. The design of the unit was such that a long, low-speed belt was employed, while the two-speed gear was operated by metal-to-metal cone clutches, operated by heel and toe lever. Though neat and ingenious, the unit was never a commercial success. The engine was  $2\frac{1}{2}$  h.p.



The Precision Junior unit, in which space and weight are economised by the employment of a central shaft which answers the dual purpose of camshaft and intermediate shaft of the two-speed gear. No clutch is fitted in this diminutive unit.

promised wonderful development, but because they were before their time they were turned down by the purchasing public.

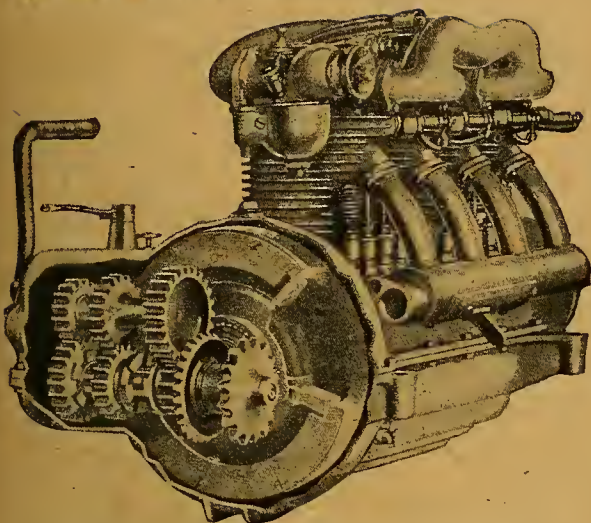
### Where the Integral Unit Scores.

What are we aiming at in motor cycle design? Foremost come simplicity, neatness, reliability (a minimum of adjustment and of wear), a clean and compact exterior, a well protected and well oiled interior, lightness, and accessibility. Dealing first with the advantages of the single unit system, let us take these talking points in order.

(1.) SIMPLICITY.—A design which calls for an absolute minimum of adjustment is the simplest. In popular present-day design, in which we have the engine amidships, the gear box separately suspended a foot to the rear, having its own adjustment and its chain drive, the magneto thrown in where it fits, and likewise having its driving chain adjustment, we cannot claim simplicity. We have here various adjustments, and by minimising the necessity for adjustment we



## Engine and Gear Box as a Unit.—



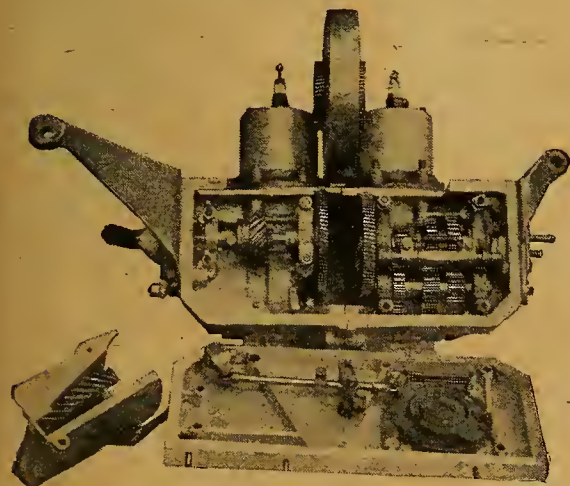
The Henderson is a neat and interesting example of integral unit design. The unit comprises engine, three-speed gear box, clutch, magneto, carburetter, induction pipe, and silencer, all of which can be dropped out of the frame as a whole. Practically any working part inside the crank case can be adjusted or replaced by turning the unit upside down and detaching the lower half of the crank case. Inspection doors are also provided, so that the engine and gears can be examined in the frame.

minimise the likelihood of breakdowns which are the result of neglect. In the integral unit system adjustments are reduced to a minimum.

(2.) **NEATNESS.**—In this respect the integral unit system is so obviously superior that we need not dwell upon the point.

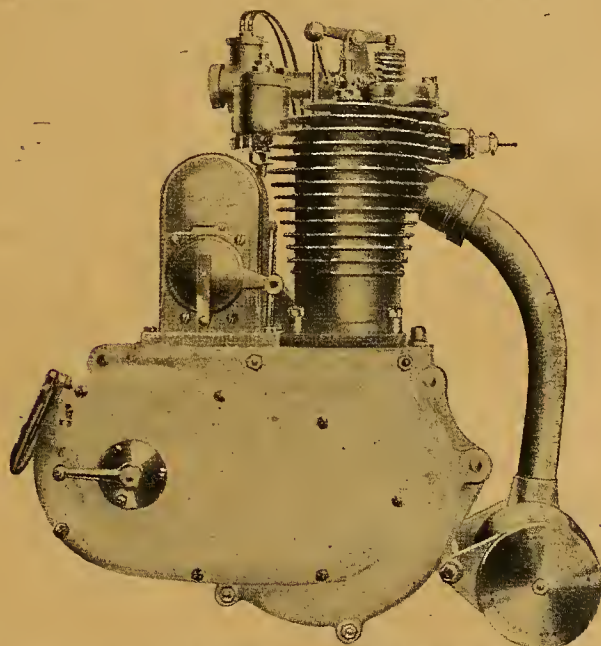
(3.) **RELIABILITY.**—This is partly covered by the first heading. By eliminating adjustment, reliability is increased; and, further, by ensuring fresh lubrication fed at a regular speed to all hard-working parts, reliability and reduced wear are ensured.

(4.) **A CLEAN AND COMPACT EXTERIOR—A WELL-PROTECTED AND WELL-OILED INTERIOR.**—As regards



The Scott Sociable two-stroke unit departs from standard practice almost throughout. Its specially designed cone clutch occupies a purposely inaccessible position inside the flywheel, the drive being by skew pinions to the gear box on one side and the water pump and seat-starting mechanism on the other. From the gear box the drive is by enclosed shaft to the rear wheel.

appearances, the more modern designs here illustrated speak for themselves. Many of them are a joy to behold as regards compactness and neatness. The lubrication for the transmission is, of course, fed from the engine, so that so long as the engine obtains its oil the remaining important parts are certain of their share. The oil may be fed from the engine through the clutch to the gear box and final reduction gear, the overflow, or release, being situated at a correct level at the rear end of the unit. Thus, in the case of a four-stroke, all the important bearings can be pressure fed throughout the system by crank case compression. Some riders may object to having their clutches locked up in any way, but here it may be pointed out that the ingenious designer of the Scott Sociable has purposely placed his clutch in such a position that the owner of the vehicle cannot get at it. This is rendered possible by the employment of a design of clutch which cannot require attention, and



The Villiers four-stroke unit was remarkable for its exceedingly clean exterior. A silent chain was employed from engine to countershaft, the clutch being inside the countershaft chain wheel. This 2½ h.p. four-stroke was abandoned four years ago. Note the entire absence of protruding shaft ends.

if the clutch be designed to occupy an inaccessible position, then by all means shelter it from restless fingers. As for cleanliness, the single unit has it every way. It has fewer joints, no oil-clinging chains, and a minimum of exposed bearing ends. The Jowett light car engine is the cleanest I have come across.

(5.) **LIGHTNESS.**—The system offers the possibility of a reduction of weight, because it does away with countershaft chains and sprockets, the drive being direct from engine to gear box, but this advantage would be very slight.

With accessibility and cost of production I intend to deal later.

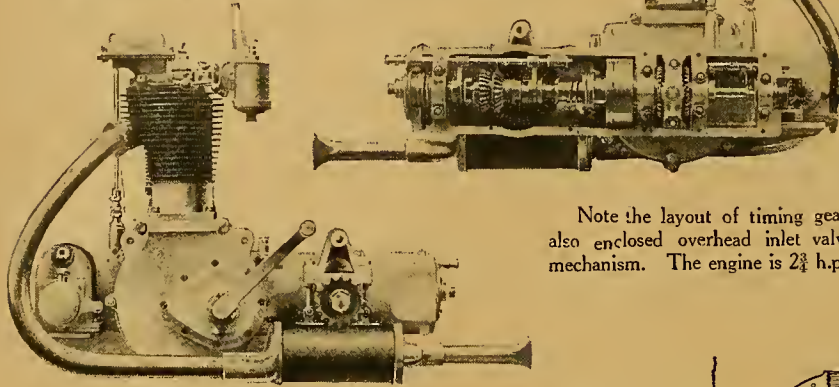
#### A Unit braced in itself.

We have here several strong talking points in favour of the single unit system, but there is yet one more. By the employment of this system the frame can be



### Engine and Gear Box as a Unit.—

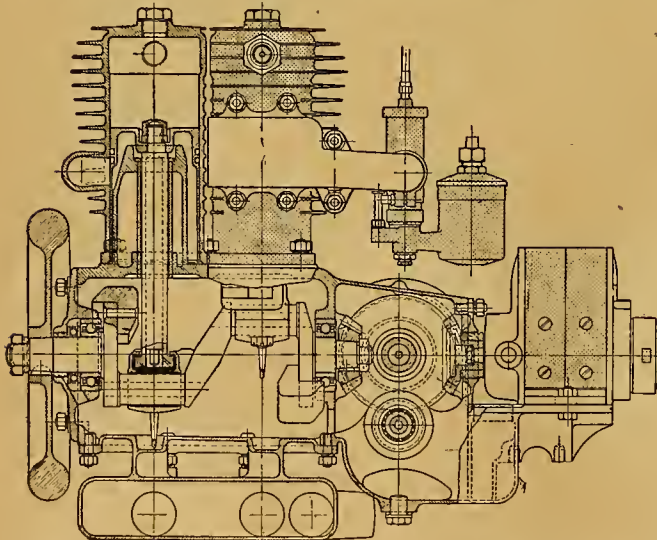
The Diamond power plant, which has figured successfully in public competition, was originally designed in 1911. In the top illustration the cover is removed, leaving transmission *in situ*. A double cone clutch is situated between the engine and gear box, the two gears being obtained by the employment of dog clutches on respective sides of the bevel pinions.



Note the layout of timing gear, also enclosed overhead inlet valve mechanism. The engine is  $2\frac{1}{2}$  h.p.

considerably lightened and simplified—in fact, it can be reduced to truly scientific lines. An integral unit is braced in itself and self-contained, instead of the stresses being thrown about haphazard. It can be slung under the frame by two points of contact, which are placed at the apices of the frame triangles, and thus it will be obvious to any engineer that both its method of suspension and its self-containedness would not only adapt themselves to an ideal frame design, but also they would tend to minimise vibration.

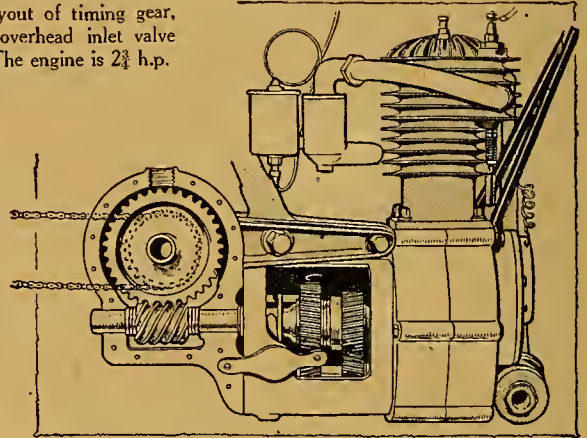
So much for the advantages of the system, with which the article is primarily intended to deal. Various “disadvantages” have been pointed out, but



The two-cylinder two-stroke Premier, in which piston rods are substituted for the conventional connecting rods, the big end bearings being fitted with slides in which are carried the flat feet of the rods. The longitudinal drive is transferred to the transverse direction by means of bevel gearing, while another bevel is used to drive the magneto. The gear wheels to provide three ratios are carried on the main cross shaft, while the lay shaft is directly beneath it. The six wheels are always in mesh, and engagement is obtained by means of balls in the hollow shaft, which are pressed outwards into half spherical sockets in the gear wheels.

most of them appear to be based on past designs, which were clearly undeveloped rather than to be inherent defects inseparable from the system. The disadvantages claimed are: (1.) That the man who makes the engine does not make the gear box. (2.) That a worn bearing in any part of the unit causes the defect to be felt throughout the mechanism, and is difficult to replace. (3.) That in order to get at anything, barring the cylinder, one has to drop the whole unit out of the frame.

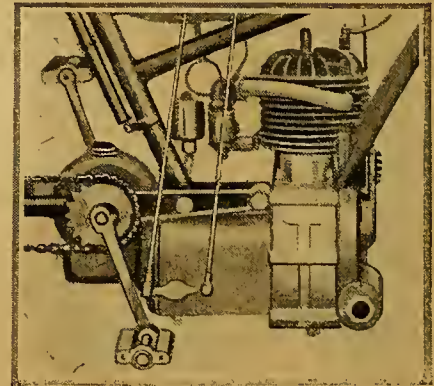
Again I will deal with the points in order. No. 1 is the first real



Showing the transmission of the Swift unit with the gear box inspection cover and half the worm gear casing removed.

stumbling-block as yet, but in these days of self-aligning bearings half the difficulty is removed. Given a simple design of gear box the manufacture of the pinions, etc., presents no difficulty, all bearings throughout being of the self-aligning type.

No. 2. I see no reason why a loose bearing should affect the whole unit, for there is positively no reason why the units, though contained in the same case, should not be as independent of



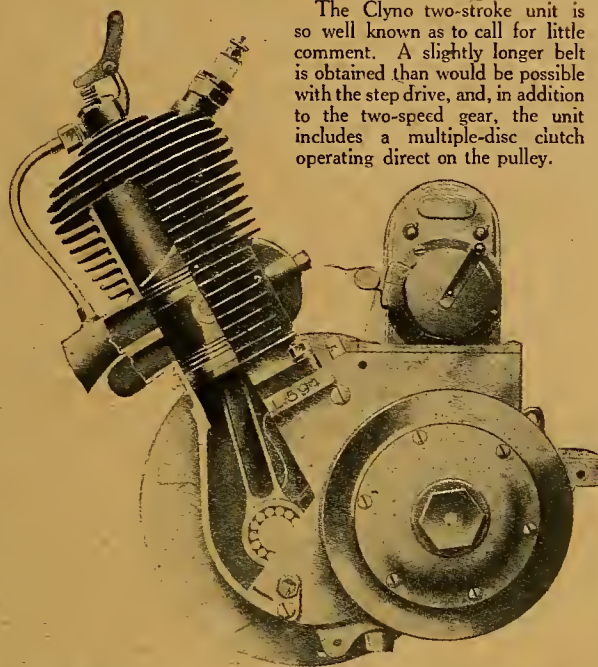
each other as they are in the popular “scattered” design. I can find no better word for it. A slack fitting castellated connection or dog clutch between clutch and gear box is, of course, desirable.



**Engine and Gear Box as a Unit.—**

No. 3 appeals as another objection of the milk and water type. We take it that in the ideal integral unit system the whole bottom half of the casing will be in one piece, the joint being midway, while the top of the casing is provided with large inspection plates. A defective bearing means, in any case, a good deal of work—probably a general inspection, so why not drop the unit out of the frame and do the thing properly. The integral unit adapts itself to a very simple method of attachment, and by removing the top half of the casing the whole gear box, etc., would be revealed, the self-aligning bearings could be removed, and a thorough inspection made throughout.

I may be suffering from a mental obsession; if so, I tender my hearty apologies to all readers of *The Motor Cycle*. To the journalistic mind the single



The Clyno two-stroke unit is so well known as to call for little comment. A slightly longer belt is obtained than would be possible with the step drive, and, in addition to the two-speed gear, the unit includes a multiple-disc clutch operating direct on the pulley.

unit system makes a strong appeal on account of its simplicity, its rigidity, its grit-excluding properties, and its cleanliness. Why it has not developed over here is—in my humble opinion—because the British motor cyclist is either too much of a conservative or too little of an engineer to realise its possibilities. He does not purchase a machine on the strength of the salesman's "hot air." Having heard the salesman through he goes home determined to discount every word he has heard, and finally he buys a belt-driven single, because his cousin, three years ago, obtained very satisfactory service from such a mount. Before the war invention over here was a chilly game, and though there is much more I would like to say

about the single unit system, one dwells, in these days of paper scarcity, in mortal dread of the blue pencil.

CHINOOK.

## D.R.'s AND THEIR WORK.

(IN FOUR INSTALMENTS).

### I.—TYPES OF DESPATCH RIDERS.

BY D.R.

**W**HEN the war broke out motor cyclists were invited to offer their mounts and their services to their King and country. At the time there was little attempt made to ascertain whether the recruits were experts or the merest novices, or to fix fair prices for any machines taken over by the Government. Consequently some terrible "wash-outs" were engaged, and their machines were taken over at ridiculously high prices. A pioneer of the very earliest motor cycling days might wish to serve, but he would be turned down because he and his mount both looked too old. This man might eventually have to serve as a private in an infantry regiment because he still happened to be under forty. On the other hand, adventurous youths with very little experience were taken on and provided with new machines. Some of these have since become hard and expert riders, but others never will become experts until the war is over and they realise the cost of keeping their own machines in repair. Any artificer in the Service will immediately recognise the type of youth to whom I am referring.

Next we got the theoretical motor cyclist who knew all about every motor bicycle on the road from reading about it! He was seldom seen without a bundle of motor papers or manufacturers' catalogues or hand-books. He could tell you the c.c., speed, revs. per minute, weight, price, fittings, equipment, etc., of any machine you could mention. But he had never

owned or ridden any of them. When it came down to actual practice he was only a little better than the type of D.R. last mentioned. He at any rate had some idea as to how a machine *should* be ridden and cared for, whether he could do it or not.

As time went on we arrived at the "Lord Derby registration paper" and "combing out" stages, and then we got a wonderful assortment, from the true sport and patriotic Britisher down to the funk who wished only to evade the trenches.

### The Best Type of D.R.

There is another type of D.R. not included in the above scathing criticisms. He is the gentleman and a true sport. He was always keen on motor cycling as a hobby, and always kept first-class machines in first-class order. When the time came it was quite unnecessary to tell him that his King and country needed him. He knew it. He enlisted as a D.R., and did any kind of work allotted to him without grumbling, and always took as much care of the machine entrusted to him as if it were his own. He may still be doing the most dangerous work and living under the greatest hardship. He may have succeeded in getting a commission and now be using his authority gently, but firmly, over the other types of D.R.'s I have mentioned. Or he may have graduated to the Royal Flying Corps and done good work in that branch of the service.





## OVERSEAS SECTION.

### A Commentary based upon Practical Experience and a Study of Overseas Opinions.

**The Future of the Four-cylinder Motor Cycle.** ONE seldom comes across the rider of a modern four-cylinder motor cycle who has anything but praise for it, and there is no doubt that a big future awaits this type of machine. Its unique pulling powers at low speeds, combined with cool running, render it particularly adapted to Overseas requirements, while it is capable of attaining a rate of revolutions which is attractive to the speed man. It lends itself particularly to a positive form of drive, to the elimination of chain cases and adjustment, and to the integral unit system by which the gear box and clutch are contained in a grit-proof housing adjoining the crank case, thus ensuring perfect lubrication throughout. The majority of British manufacturers have not, at the moment, very much opportunity of experimenting, but in many leading factories one finds on the drawing boards entirely new designs which are to materialise when conditions permit. Among these the four-cylinder figures conspicuously, while clearly there will be no dearth of flat twins from leading factories. The majority of the "fours," however, will be primarily designed for sidecar use, though this in no way signifies that they will be cumbersome for solo riding. On the contrary, the majority of the British fours will be a good deal lighter than the American four, which has already attained a fair degree of popularity Overseas.

✻ ✻ ✻

**Are Chain Cases Desirable?** RECENTLY we were discussing a certain Russian military model with a group of Australians. The unhappy mount reviewed was fitted with chain cases in place of a simple chain shield which had previously characterised this make. The chain cases were good, substantially anchored and solid, but our Australian friends condemned their presence—almost to a man. "If I had that machine over there," stated one of them, "I should have those cases off within a fortnight—if I didn't take them off before riding the machine home!" This state of affairs is distressing. The manufacturer knows that chain cases are good for the Overseas rider, and, accordingly, he is spending much time and money in perfecting them; but is it only to have these luxurious fittings left at the roadside or poked into a rabbit hole when the machine reaches its destination? Our own experience of enclosed chains is that, provided sufficient ground clearance be left in the vicinity of the countershaft, they are entirely satisfactory, and it must be borne in mind that their presence adds enormously to the life of the chains and sprockets. The life of a properly encased chain transmission is, indeed, almost endless.

#### Fostering British Trade Abroad.

THE New Zealand globe trotter, Mr. J. B. Clarkson, is in England again, and for the last fortnight has been busy doing the round of English motor cycle manufacturers. On the occasion of the present visit he was invited to attend a meeting of motor cycle manufacturers with the idea of discussing Overseas trade, to which he gladly assented. The meeting was a private one, so we are unable to pay more than a passing reference to it, but we are glad to think that British motor cycle manufacturers seized the opportunity of obtaining from Mr. Clarkson first-hand knowledge of the condition and requirements of certain of our Overseas markets. We only wish that it had been possible for *all* manufacturers directly concerned in Overseas trade to have been present. Collaboration of this kind—even if everyone may not see eye to eye with Mr. Clarkson—cannot but do good to the industry at large, for only by a frank discussion of our mistakes of the past are we likely to be able to exploit to the full the possibilities for British motor cycles in countries abroad.

✻ ✻ ✻

#### Clutch Control.

It has always been a matter of some mystery to us that the Americans, who have often advocated control accessibility, should have stuck unwaveringly to the tank clutch lever in preference to the handle-bar lever. Our own experience of country roads in the States is that the handle-bar clutch is the very thing above others that one is left craving for. We recall one ride in particular when, mounted on a well-known make of American machine, our way led along a trail which, at certain points, was deep with black slime, and the transmission being a trifle harsh, the only way to get along at all was by constant clutch slipping. Neither the pedal nor its position was particularly well adapted to the work. On account of the rough going one was compelled to stand hard on the footboards, with the result that one's left foot was fully employed. The control necessitated supporting one's weight on one's heel and manipulating the clutch in the best way possible with the tip of one's toe. The result was that one lacked that delicacy of control which makes all the difference in the manipulation of a clutch. One gets used to the foot clutch, of course, but that the handle-bar clutch is infinitely superior to the pedal variety is maintained by our D.R.'s, one of whom openly states that no machine is fit for use under the conditions of warfare unless fitted with a h.b.c. clutch. The ideal system is an inter-connected hand and foot control for the clutch, such as many British makers now provide.



**All-British—** Thus ended the proclamation of the "No More natives on the annexation of a certain um Kaiser!" German possession in the Pacific, and so say all of us—"No more um Kaiser!"

The British magneto of to-day is a top notch article, surpassing in quality the much-quoted instrument of Kaiserland, and each week recently our letter bag has brought us comments from riders all up and down concerning the excellent treatment received from British magneto makers. Momentarily diverting—some of the British magnetos produced early in the war were admittedly inferior to the Bosch. This was on account of the absolute lack of materials, on which the vitals of the magneto depend, and upon other difficulties of manufacture too numerous and complex to discuss here. Since then our chemists have been at work, and trade has developed, and now before us behold the British magneto, the instrument employed by every aeroplane, motor cycle, and motor boat produced for the British Forces! And, as Britain stands on her own legs for magnetos, so she is self-supporting for the various other accessories and gadgets previously hailing from Kaiserland. After the war the patriotic purchaser will be able to demand a machine which is all-British from end to end down to the smallest accessory. The enormous advancement that has been made can only be appreciated by those in constant touch with trade affairs; we have left the Huns standing as regards accessories, and so with the patriotic Kanaka of the South Seas we exclaim, "No more um Kaiser!"

**British Exports of Motor Cycles.** **ALTHOUGH** all motor cycle manufacturing firms are busy on munitions, we continue to develop our Overseas trade to an extent satisfactory under the circumstances. It is indicative of what the future may hold for exporters, when in the midst of war we can send out £80,951 worth of motor cycles and parts in one month, as was the case in June. A good deal of comment was heard on the rather large drop in British exports for June as compared with May, nearly every industry showing a decrease. One of the exceptions was the motor cycle export figures, which showed an increase of £20,000 on the previous month. The figures for the half-year 1917 show that we exported motor cycles, parts, and tyres to the value of £438,747. This is an increase on last year's figures of £58,131, and on the 1915 returns of £97,589. Compared with pre-war times this year's figures are only slightly under those for 1913. Certainly in 1914 there was a big jump of £159,520 over the six months of 1913, but when the great upheaval of the industry is taken into account, and a moment's thought given to the adverse circumstances under which foreign trade is at the present time being fostered, it is surprising and gratifying to observe how well we have maintained our connections abroad in the third year of a great war.

### American Competition Again.

R.E.H., AUCKLAND, N.Z., writes: "This is just a letter to make our usual New Zealand complaints. Yankee cars and motor cycles are having a great run now, mainly on account of their low prices.

"The Indian offers a special inducement in addition to low price—a spring frame and good clearance, both of which are indispensable. Of course a machine like the Bat has a better spring frame and general appearance, but the price—it makes one weep to contemplate the difference. A local agent has just unshipped two motor cycles—a 5.6 h.p. Ariel and a 9 h.p. American Dayton. Both are equally well off in specification. Each has a spring saddle pillar, but the Dayton has a better appearance, being finished in dark red. The price of the Ariel is £105, Dayton £85.

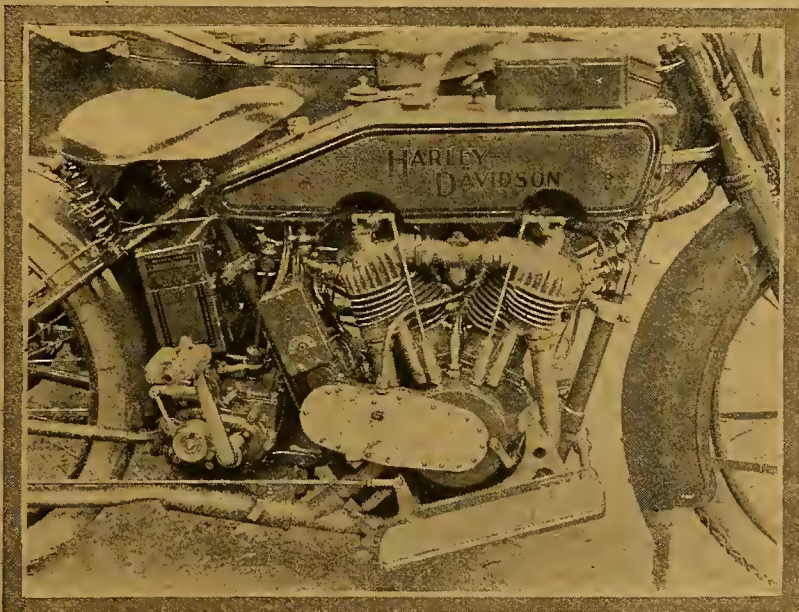
"Many would prefer the Dayton, apart from the price, with its good springing, mudguarding, and clearance; but the Government are not inclined to use Yankees. They have a large number of Enfields with sidecarriers, which they use for collecting mails in the city and suburbs from the pillar boxes and for delivering letters in some of the outer suburbs. I will send you a photograph of one if I can. Many tradesmen are now using sidecarriers, and I have seen several attractive combinations, which are splendid advertisements to the businesses of the owners. Evidently the work of *The Motor Cycle* has not been fruitless in this direction.

"If some live English firm would send an agent (a real businesslike one) to New Zealand to represent them specially and to keep large stocks of spare parts at low prices, I am sure our Parliament would recommend the directors of the firm for the V.C. or some such award.

"The Douglasses, though the price is £76 13s., are very popular; also J.A.P. engine twins for sidecar work, but the Indians run the J.A.P. engine machines close.

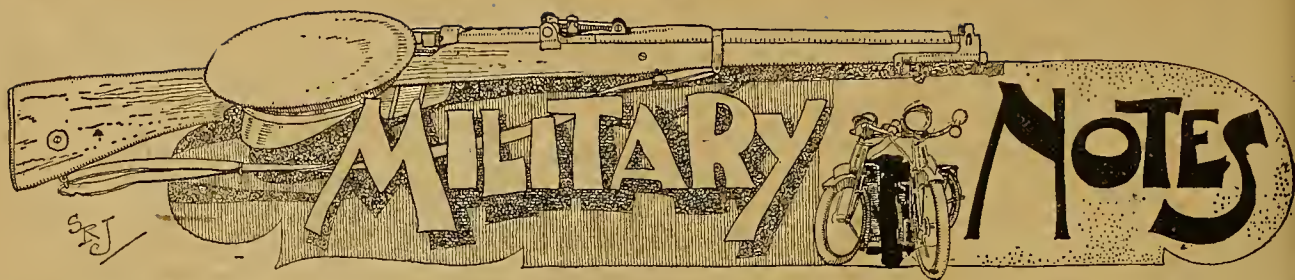
"I wish your paper, which is very popular here, every success."

MR. F. S. JALFREEZE, writing from Calcutta, India, says: "I have always had great difficulty in procuring spare parts, and in the future British manufacturers would do well to send out a plentiful supply at reasonable prices. I know this cannot be expected during the war, but afterwards British makers will be obliged to attend to this most important matter as thoroughly as the Yankees if they wish to increase their market."



Whilst the controversy respecting the £100 light car rages, luxurious sidecar outfits valued considerably in excess of this amount are popular in England. One such, costing £160, was described in *The Motor Cycle* of July 12th, and the power unit of this machine, a 7.9 h.p. Harley-Davidson, is illustrated above. It will be observed that the Remy lighting system is used in conjunction with a separate magneto.





### A TRIO OF ARIEL RIDERS.

**A**NOTHER interesting letter reaches us from F. C. North, the old Ariel rider. Since he last wrote he has been in most parts of the British line, and for the last two months has been spending a quiet time in a quarry some twenty miles from civilisation. The Boches occupied the spot last year. He tells us that he has not seen in that time either a civilian or a whole house, with the exception of an occasion when he had a day off, and went back behind the old line to find poor Fred Sangster's grave, in which search he was successful. North often meets Fred Langton, as he is in a brigade in his Division. The trio named will all be recognised as former Ariel riders. Langton's innings at the Front dates from August, 1914, and North runs him close for length of service.

### IMPROVING ROADS IN MACEDONIA.

**W**RITING from Salonica a despatch rider says: "My letters hitherto have dwelt upon the extremely rough roads in this part of the world; but if you saw some of the roads which have been made since the British Army landed here you would be astounded. Of course, very heavy traffic is constantly passing over them, and a lot of repairing is needed. What a pity it is there are not more roads like them, for after reasonably comfortable riding we suddenly strike a 'native' road, and get terribly shaken up. My friend had the misfortune to have his steering column break the other day. This is the third mishap in a month. Frames occasionally snap, and even the handle-bars break, so you can imagine the terrible state of the road surfaces. Of course, we think nothing of saddle springs and front fork springs snapping."

### MOTOR CYCLISTS IN CAPTURED ENEMY TERRITORY.

**M**EN of the motor cycle workshops at Dar-es-Salaam, G.E.A., have followed the discussion of flat twins in these columns. Sgt.-Mech. J. D. Mail writes: "Just a line or two from our part of the globe in appreciation of your splendid paper. While up country and out of touch with postal facilities it was sorely missed, but recently I have been able to get my copies regularly. As a rule I have quite a crowd waiting for me to hand over my copies for their perusal."

"We in the workshops here have been very interested in the discussion re flat twins. For myself, I think they are really marvellous engines, and do almost impossible things. One is surprised when

overhauling derelicts to discover that the interiors of the engines are invariably in first-class condition. Of course, most of the models here are only of the two-speed type, unfortunately; but fitted with an emergency gear it is the ideal machine for solo work. Of course, the Triumph and B.S.A. are grand machines in their class; but on these roads, where it is impossible to ride in some places, the handiness of the little flat twin is very noticeable.

### Are Magnetos Waterproof?

"One of the greatest troubles we have here is the magneto, many (so-called) waterproof magnetos being anything but such, and it is quite a common sight to see a despatch rider by the roadside toasting his armature and windings in his mess tin. Of course, you people will say drastic treatment, but I can assure you he finds it the only method on the road.

"Back wheels, rims, and spokes especially call for great improvement, also more efficient mudguarding. Most of the machines on the road are denuded of the last-mentioned appendages.

"I have been very interested in the performances of the A.B.C. engine, and have been in touch with a couple in my district (Pietermaritzburg, Natal) for two years or so, and have decided that

my next mount shall be a  $3\frac{1}{2}$  h.p. twin A.B.C., with all due respect to Mr. de Lissa.

"In our workshops here the lathe (a small Drummond), drilling machine, and emery wheel are driven by a  $2\frac{3}{4}$  h.p. Douglas through a countershaft gear box, and it does its work excellently, running very often for eight hour spells."

### POWER OF TWO AND FOUR-STROKES.

**W**HICH type of engine gives the greater b.h.p. — two-stroke or four-stroke? This simple question raised during officers' mess at a certain military camp subsequently led to heated arguments. Whilst the majority contended that the two-stroke would win—the double explosion largely attracted that section—the opinion in favour of four-strokes was really weighty. Since money was won and lost after the question had been put to the Editor of *The Motor Cycle* for decision, it would be of considerable interest if any engineer who has actually subjected both types of engines of similar sizes to brake horse-power tests would chronicle his experiences, supplemented by the figures obtained. Power is the only question involved.



The British Red Cross Society and the British Ambulance Committee have both sent out ambulances and men to the French Army. Mr. G. F. Haywood (on right), formerly on the staff of *The Motor Cycle*, was with No. 2 Section Sanitaire Anglaise of the B.A.C., and is now in the R.N.A.S. Both the riders are astride Rover motor cycles.



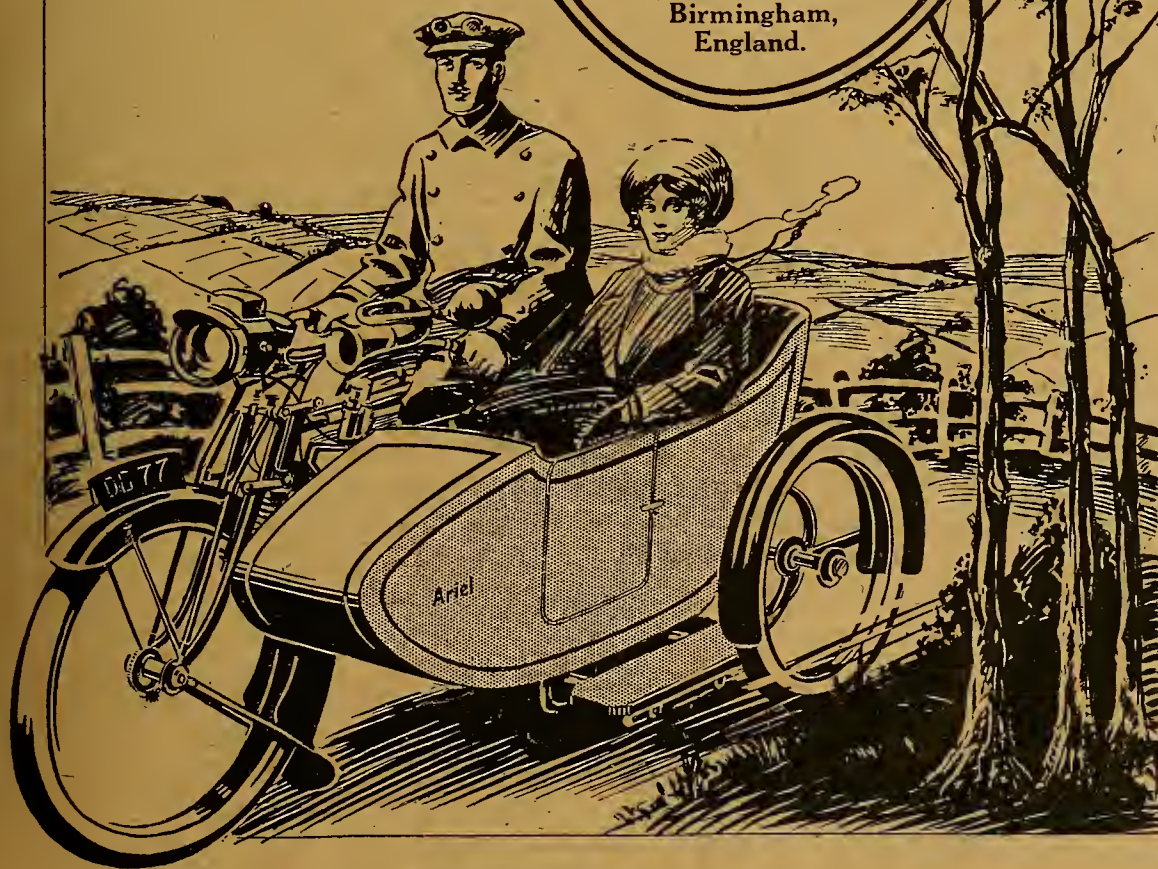


**The Motor Cycle of  
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By brilliant victories in all the most important reliability contests, by excellent performances in the service of owners all over the world, by splendid achievements on war service.

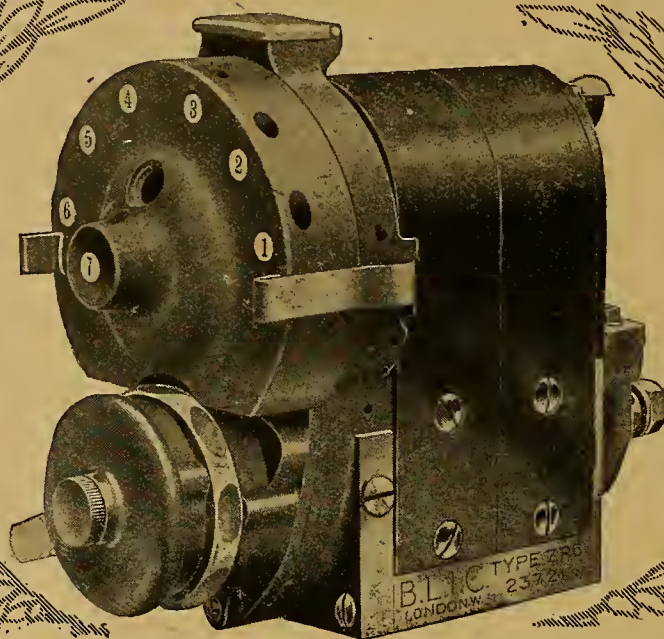
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**ARIEL WORKS, Ltd.,**  
3, Bournbrook,  
Birmingham,  
England.



*In answering this advertisement it is desirable to mention "The Motor Cycle."*





## The High-grade British-built Magneto!

# B.L.I.C.

THE BRITISH LIGHTING & IGNITION CO. LTD.

The "B.L.I.C." Magneto is produced by an organisation with many years of practical experience in the manufacture of magnetos of the finest type.

The most careful scientific research into every detail, and the absolutely accurate standards of construction employed, have placed it in an unassailable position as the most perfect magneto yet produced.

**THE BRITISH LIGHTING & IGNITION Co., Ltd.**  
(Proprietors: VICKERS, LIMITED),  
204, TOTTENHAM COURT ROAD, LONDON, W.1.



## WHO IS THE YOUNGEST D.R.?

RECENTLY the question was asked as to who was the youngest despatch rider on active service, and the case of Motor Cyclist W. Norman Roughley, of Rochdale, was instanced.



Despatch Rider W. N. Roughley, R.E.

Young Roughley was but eighteen years and two months when he went out to France. He is depicted in the accompanying photograph astride his Douglas, and he looks very happy in his steel helmet.

□ □ □

## THE KING AND THE TANKS.

ONE of the most amusing and picturesque descriptions of the Tanks that has ever been penned was sent by the special correspondent of the *Times* on the occasion of the King's recent visit to the Front. We give this vivid word painting in full.

"The King and his party strolled across an open field with no sign of danger anywhere, except that close by on one side was a little patch of woodland. Suddenly the woodland began to quake and move as Birnam Wood never did. The bushes crunched and crackled, and the tree-tops swayed as if a herd of elephants were browsing within. Then one fair-sized tree began slowly to lean over towards the King, bent down till its crown rested on the ground, and then snapped. The undergrowth heaved and gave out strange rumblings, as of some huge monsters making great exertions, till, with a crash and amid an ecstasy of swaying greenery, out through the bushes came Leviathan.

"It was very horrifying to see as it came lurching and puffing out—first the hideous huge snout, and then the ponderous shoulder lifting through the bushes. Nor was it alone. Close beside was its brother—if possible, uglier and more grotesque—with hits of branches wreathed about its abominable head. Together the twin primordial monsters rolled out into the open, grunting and searching for something to destroy.

"A trench had been prepared for them—a nice deep trench—with stout wire before it, and dug-outs such as the Germans love to shelter in. The brutes saw it all, and, lurching horribly, they moved upon it. The stout wire bent down

like weeds before a garden roller on a path. They came to the trench and nosed along it, so that one could almost hear them snorting, 'Fee-fo-fum!' They were smelling blood; they cuddled down upon the trench and rolled the parapet flat; and it would have been bad for any Germans thereabouts. Then they attended to the dug-out, moved up to it curiously, and hesitated at it, dallied doubtfully with it for a while, then lay down upon it, and the dug-out opened out like a lily, and was a practicable dug-out no more. The deliberate intelligence and ponderous mercilessness of the great beasts were dreadful to see.

## The King in the Tanks.

"Then another Tank arrived—but a friendly Tank, this—and the King and Prince of Wales climbed in through the hole in the side and went for as fantastic a ride as ever a King had.

"Yet one more Tank gave a gymnastic display of ground and lofty tumbling. The King stood facing a steep bank almost as sheer as the side of a house. From the other side a Behemoth came lumbering up the slope to the bank's crest, and there it rested, peering down the abyss below. It seemed impossible that it could expect to come down; but while all the spectators held their breath, the gigantic thing slowly lowered its blunt nose into space, and then headlong it plunged.

"Why it did not roll over on its back only Tank experts know. For one moment it seemed as if it must, for the great bulk crashed against the ground and rocked right over on one side, to hang suspended for an instant, and then slowly swing back upon an even keel. The King ran up and met the young officer in command of the land ship as he climbed out and came ashore. The King asked him if he was hurt, and on receiving a laughing answer in the negative, insisted on all the crew of the Tank coming out, that he might look at them and talk to them. So the Iron Horse of Troy opened its side, and the whole crew came scrambling out, to stand to attention, breathless and smiling."

## WAR-WORN MOTOR CYCLES.

A FRENCH reader, residing at Boulogne-sur-Seine, writes to us concerning the offer by the British Red Cross Society of second-hand motor cycles used on the French front. He considers that it would be more economical to dispose of these machines in France, where, owing to the scarcity, motor cycles are commanding high prices. Personally, we look upon the suggestion as a sound one, since there is no dearth of second-hand machines in this country; and, moreover, the trouble of handling motor cycles on the cross-Channel trip would be avoided. We have communicated the suggestion to the British Red Cross Society, and the Director of the Motor Ambulance Dept. has been good enough to express his views. It appears that owing to the prohibitive duty that would be charged were the motor cycles sold in France, the course is impracticable.

□ □ □

## FOURTEEN MONTHS IN FRANCE.

WE recently had a letter from Cpl. C. T. Ringham, Despatch Rider R.E. Cpl. Ringham was for many years in charge of the new and second-hand motor bicycle department of the Service Co., Ltd. He has now been a despatch rider for fourteen months, and is with the British Expeditionary Force in France. He writes: "I am glad to see that *The Motor Cycle* is, if anything, more interesting than ever. It is certainly a link with old associations, and does not suffer through the war. I am riding a Triumph, and have nothing but praise for this make, which, as you know, I have had the pleasure of handling, among many other makes, for some years. You may take it that a three-speed gear and a hand-controlled clutch are necessities out here. For example, when going up to a brigade at night, with no lights, on a vile and narrow road, on which there are crawling ammunition lorries and restless mule teams, this system of control is a boon. The way the Triumph stands up to the work is marvellous."



Despatch riders attached to the Royal Flying Corps, all mounted on P. and M. motor cycles. The photograph was sent by the parents of Cpl. Thornton (fourth from left). Previous to the war Thornton rode an Enfield in several trials.





## TIME TO LIGHT LAMPS

SUMMER TIME.

July 26th	...	9.26 p.m.
" 28th	...	9.24 "
" 30th	...	9.21 "
Aug 1st	...	9.18 "

### Petrol Consumption in U.S.A.

During the nine months of current fiscal year the United States exported approximately 290,000,000 gallons of motor spirit. Yet during that period she consumed three times the quantity.

### Petrol in the West.

Several of our readers propose to ride from London and the Midlands to the north coasts of Devon and Somerset, and would be glad to learn the experiences of others with regard to the difficulty or otherwise of purchasing petrol supplies *en route*.

### Heavy Hand Clutches.

Many riders, who complain of the stiffness of their handle-bar clutches have only themselves to thank for this state of affairs, in that the clutch springs are often tightened up a good deal harder than they need be. The tension need be no greater than just to avoid slip, which, if chronic, would spell short life for the clutch plates.

### Bedell's Ride.

Alan T. Bedell—who rode across the United States (3,296 miles) in 7 days 16 hours 16 minutes on a four-cylinder Henderson—as a precaution changed his tyres and chain after the first 554 miles, re-tyring again at Kansas City, this set lasting him the journey into New York. He experienced only one puncture during the ride. The only mechanical troubles were broken fuel pipes and front fork springs, and apart from new valve springs, a couple of chain changes, and tyre renewals, no replacements were made.

### Horse Racing and Motoring.

The Jockey Club, by their persistence, have been successful in securing the Government's permission to continue racing. Their plea has been that by racing only could horse breeding be kept at its former high level of excellence. Comparisons are odious, but one wonders whether the motor industry has not been too unselfish in refraining from fighting the restriction that has been placed upon it. There is no questioning the fact that the innumerable Government orders have tended to create an unreasonable public feeling against motoring by private individuals, no matter how justifiable may be the reason for using either a motor cycle or car.

## SPECIAL FEATURES

THE HOTTEST PART OF AN ENGINE. ENGINE AND GEAR BOX AS A UNIT. OVERSEAS SECTION.

### Our Importation of Petrol.

Our petrol imports for the first six months of 1917 were nearly 69,000,000 gallons. This is a falling off of 1,000,000 gallons compared with the quantity imported during the first six months of 1916, but an increase of 6,000,000 gallons over the same period in 1915, and 9,000,000 gallons over a similar period in 1914.

### The Late William Heaton.

The funeral of William Heaton, of Atherton, near Manchester, whose sad death we recorded in our last issue, took place last week at the Atherton Cemetery. Among the mourners were: G. Cowley, W. Mason, C. E. Kettle, Jack Stevens, J. Stevens, sen., and O. Wade, representing the Liverpool Motor Club, Manchester Motor Club, North-Western Automobile Association, Stockport and District Motor Club, Wolverhampton Motor Cycle Club, etc. Amongst the many beautiful floral tributes were those from A. J. Stevens, Ltd., A. J. Stevens's employees, Percy Butler, Colmore Depot, G. Cowley (Manchester), J. Chapman (Wolverhampton), fellow motorists at Tyldesley, F. Lord (Tyldesley), Liverpool Motor Club, W. Mason (Walsall), Manchester Motor Club, Stockport and District Motor Club, A. J. Stevens (family), Jack Stevens, Wade and Smyth (Liverpool), and Wolverhampton Motor Cycle Club.

### Mechanics for the U.S.A. Army.

Mechanics offering their services to the U.S.A. War Department are entered as enlisted men at 37s. 6d. per week.

### Pillion Riding.

Though, as our readers well know, we have not given our approval to pillion riding in the past, it cannot be denied that it is an economical form of motoring; moreover, given the proper passenger, less agreeable form of economy might be experienced.

### Motor Cycles at Evesham.

Motor cycles appear to be numerous in the wide vale of Evesham, and it is seldom we pass through the picturesque old town without observing several machines stacked up by the sidewalks. It would appear indeed that some of the citizens use the public roads as garages.

### Flat Twins and Speed.

The modern overhead valve flat twin of 350-400 c.c. is probably the fastest machine on the road for moderately flat country, but on mountainous roads it is hard put to it to hold its own against a really good  $3\frac{1}{2}$  h.p. single or touring twin. More gear changing is necessary, but one advantage of the highly efficient flat twin is that it is extremely fast on its middle gear and does not overheat. A four-speed gear is almost essential for this coming type of solo mount.



### ON THE MALVERN HILLS.

Instead of the usual great pre-war crowd of cars and motor cycles usually found in front of the British Camp Hotel near Malvern on any fine Sunday, a bare half-dozen or so is about the usual number found there in these days. It is, of course, a state of affairs to be expected, but what a contrast!



**The National Relief Funds.**

At the week-end the principal war funds stood as follow:

The National Relief Fund (distributed £3,651,632) .. ..	£6,213,796	0	0
British Red Cross Fund .. ..	£7,101,106	4	8
Tobacco Fund .. ..	£134,068	2	1

**American Tourists.**

The American tourist is not yet extinct. Recently, in North Devon, we met a party of four Americans, who had between them two Douglasses, a baby Triumph, and 18 h.p. Minerva car, all of which were used on daily joy rides. How and where did they get their petrol?

**Fuel from Peat.**

A committee has been appointed by the Fuel Research Board in order to ascertain the utilisation of Irish peat deposits. We know that motor fuel can be produced from peat, but details are not to hand concerning the exact investigations of this special board. There is no questioning the fact that millions of gallons of fuel could be obtained by utilising these great peat deposits; but whether it would be a commercial success is another question.

**The Utility Car.**

Even the most conservative must admit that the Ford car is a marvellous proposition. This was brought home to us when recently visiting South Wales, as we had an opportunity of observing the neglect and hard usage to which many of these vehicles are subjected in the hands of stewards and farmers. From tractor to milk float the Ford figures, but if the possibilities of the commercial side-carrier were more fully realised, it would no longer hold the lion's share.

**Standardisation.**

We have already stated that the motor cycle manufacturers in the States are considering the standardisation of parts and fittings. It is possible that certain parts, for the use on several makes of motor cycles destined for France, may be produced by one firm; whilst other parts, also intended for fitting to various makes, will be turned out by another factory. If this idea be carried out the maximum production will be attained very quickly.

**Humour—Intentional and Otherwise.**

We read last week that it is a good plan when buying petrol to weigh each can on a spring balance, provided, of course, that one carries such an ornament on one's watch chain. The weight of petrol is stated, but as not even an approximate weight is given for the can, we suggest that a better plan would be to remove the petrol from the can and weigh it by itself on the balance, afterwards returning it to the can for convenience of transport.

From the same source we learn that "a motorist has been fined £10, or six weeks, for driving without a licence at West Ham Police Court." How foolish! If one must drive without a licence, it is wiser not to do it at a police court. Lastly, we are informed, still from the same page, that the moon, two days old, rises about one hour and twenty minutes before sunset. It must therefore rise in the West. We presume it adopts this unusual procedure because there is a war on.

**Plugs for Oily Engines.**

A correspondent asks us which is the best type of plug for a highly-efficient flat twin the back cylinder of which is normally aswirl with oil. We have experienced the same trouble ourselves, and have found that the only way out of it is to strike the happy medium between a wet plug and a starved engine.

**A Big Demand.**

With the flat twin a certain amount of oil, drained from the rings while the engine stands, is certain to find its way into the combustion head, and since this type of engine is destined to become popular, big profits await the firm that produces a truly oil-proof type of plug.

**And Special Constables Too!**

Three special constables, out for a trip in a motor cycle and sidecar with two guns, were each fined £4 4s. at the Nottingham County Bench recently. Early on a Sunday morning a policeman heard shots fired from the direction in which they were travelling. In the sidecar were a pheasant, partridge, and three rabbits, all freshly killed, as well as the two guns. The magistrates, in fining the men, ordered the guns to be forfeited.

**Memorial to the late Rear-Admiral Arbuthnot.**

A tablet was unveiled in St. Giles's Cathedral, Edinburgh, on Saturday afternoon last, in memory of the late Rear-Admiral Sir Robert K. Arbuthnot, who was lost in the Battle of Jutland. Lord Inverclyde (a relative) presented the tablet, which occupies a prominent place on one of the pillars supporting the tower near the pulpit. Those present included Admiral F. T. Hamilton, Admiral Spartin, and Lt.-General Sir J. S. Ewart, Commanding in Scotland. The ceremony of unveiling was performed by Admiral Hamilton, who paid a warm tribute to the bravery and seamanship displayed in the fight by Sir Robert Arbuthnot and the men who fell with him.

**Our Highways of the Future.**

After the war an absorbing topic with motor cyclists will be improvement of the roads, and information concerning modern ideas in road construction and administration is particularly interesting, in view of present-day road conditions. The pamphlet of the report on concrete roads, issued at the instance of the Roads Improvement Association (Incorporated), 15, Dartmouth Street, Westminster, S.W.1, shows that one association at least is alive to modern tendencies. This informative brochure at the outset contrasts the "English" engineer and British methods with the American, and says that the English engineer's caution should not be a sufficient reason for him to show timidity where progress can, and should, be made, and suggests that the use of concrete as a road material might be given a better chance in the future than it has received in the past. Reports as to the wear of existing concrete roads in England and Scotland show that they have not all been successes, and that, in spite of their unquestioned success in America, unless scientifically built failure can easily occur.

**American D.R.'s.**

The amateur and professional motor cycle tract riders in the various towns of the United States are busy answering the call to the Colours, and no doubt many fine riders will be among the drafts of D.R.'s soon to reach France. They will find the "roads" at the back of the line a different proposition from the saucer tracts to which they have been accustomed.

**AVERAGE PRICES.**

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average. The word "combination" indicates a sidecar outfit as supplied by the makers, while "sidecar" implies that the fitting has been carried out by the owner.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3½ 2-speed .....	—	£40
Abingdon ..	1914	5-6 3-sp. sidecar ..	£54	—
A.J.S. ....	1916	6 combination ..	—	£92
" .....	1914	6 combination ..	£60	£58
" .....	1916	4 combination ..	—	£78
Allon .....	1916	2½ 2-speed .....	—	£35
" .....	1914	2½ 2-speed .....	—	£27
Ariel .....	1915	3½ 3-speed .....	—	£43
" .....	1914	5-6 combination ..	—	£51
Bat .....	1914	6 3-speed .....	—	£48
Bradbury ..	1914	4 2-sp. sidecar ..	—	£41
Brough .....	1916	3½ 3-speed .....	—	£55
" .....	1915	3½ 2-speed .....	—	£47
B.S.A. ....	1916	4½ sidecar .....	£66	£64
" .....	1915	4½ sidecar .....	—	£58
Calthorpe ..	1916	2½ 2-speed .....	—	£30
" .....	1915	2½ 2-speed .....	£26	£27
" .....	1916	2½ 2-stroke .....	—	£30
Clyno .....	1915	2½ 2-stroke .....	—	£26
" .....	1914	6 combination ..	—	£56
Connaught ..	1915	2½ 2-stroke .....	—	£25
Douglas .....	1916	2½ 2-speed .....	—	£46
" .....	1915	2½ 2-speed .....	£42	£40
" .....	1914	2½ 2-speed .....	£36	£35
Enfield .....	1916	6 combination ..	£84	£86
" .....	1915	6 combination ..	£70	£63
" .....	1916	3 2-speed .....	£45	£45
H. Davidson ..	1916	7 combination ..	—	£64
" .....	1915	7 combination ..	£65	£70
Henderson ..	1916	7 combination ..	—	£100
Hazlewood ..	1914	6 3-speed .....	—	£39
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	5 combination ..	—	£64
" .....	1916	7-9 combination ..	—	£78
" .....	1915	7-9 combination ..	£70	£71
James .....	1916	4½ combination ..	—	£70
" .....	1916	2-sp. 2-stroke ..	—	£31
Lea-Francis ..	1916	3½ 3-sp. sidecar ..	—	£67
" .....	1915	3½ 3-speed .....	£55	—
Levis .....	1916	2½ Popular .....	—	£26
" .....	1915	2½ Popular .....	£21	£21
Matchless ..	1915	7 combination ..	£83	£79
New Hudson ..	1916	2-sp. 2-stroke ..	—	£28
" .....	1916	4 combination ..	—	£60
New Imperial	1916	2½ 2-speed .....	£35	£34
" .....	1915	2½ 2-speed .....	—	£24
Norton .....	1916	2½ 2-speed .....	—	£52
" .....	1915	3½ T.I. ....	—	£43
O.K. ....	1916	2½ 2-stroke .....	—	£19
P. & M. ....	1915	3½ combination ..	—	£95
" .....	1914	3½ 2-speed .....	£37	—
Premier .....	1915	2½ 3-speed .....	—	£28
" .....	1914	3½ 3-speed .....	£43	£45
Rover .....	1916	3½ 3-speed .....	—	£52
Royal Ruby ..	1916	2½ 2-stroke .....	—	£24
Rudge .....	1916	3½ Multi .....	—	£46
" .....	1915	3½ Multi .....	£40	£37
Scott .....	1916	3½ combination ..	—	£58
Sun .....	1915	2½ 2-speed .....	—	£23
Sunbeam .....	1916	8 combination ..	—	£100
" .....	1916	3½ solo .....	£76	£74
" .....	1915	3½ combination ..	£70	£80
Triumph .....	1916	2-sp. 2-stroke ..	£38	£35
" .....	1915	4 countershaft ..	—	£53
" .....	1915	2½ 2-sp. 2-stroke ..	—	£25
" .....	1914	3½ 2-sp. 2-stroke ..	£41	—
Zenith .....	1915	8 Gradua .....	—	£61



## THE MOTOR CYCLE IN JAPAN.

Spring Frames, Large Wheels, and Large Tyres are desirable features on an Overseas Motor Cycle from the point of view of the Writer.



(1) The military road winds up a range of mountains to a height of 3,000 feet above the sea level.

(2) A typical native house belonging to "well-to-do" Japanese people.

(3) One of the wooden toll bridges referred to in the article.



**E**VEN as recently as three years ago old creaks of anything from 1 h.p. to  $2\frac{3}{4}$  h.p., which had probably seen years of hard service and suffered in silence words of abuse from their owners before ultimately finding themselves in this land of sunshine and flowers and earthquakes, were being sold in Tokyo as new machines, disguised in glaring coats of new paint. But motor cyclists, be they Europeans or Asiatics, are nothing if not enthusiasts, and now these poor old stagers have been relegated to the scrap heap and replaced by modern machines. Every reputed make is represented; but it cannot be said that this king of sports has yet taken a hold of the enterprising Japanese. There is a band of enthusiastic European and American motor cyclists in Tokyo, of whom the writer, who graduated from his novitiate in England in the good old days of the front wheel driven Werner and Minerva-engined mounts, is one. It is hoped that a club will soon be formed. There exists already in Kobe a motor cycle club, which, under the presidency of a keen American, held recently a hill-climbing competition, the first event of its kind in Japan. The event was won by a  $3\frac{1}{2}$  h.p. Bradbury, the formula adopted being the one published by *The Motor Cycle*, viz.:

Weight

Time<sup>2</sup> × Capacity

Twins, less 10% capacity.

### Japanese Roads.

The roads in Japan are generally comparatively good, and in places excellent. Of course, owing to the mountainous nature of the country, a road which one day is ideal, may on the next, after a heavy rainfall, become impassable. Then, owing to the extremely simple and crude system of road mending, which consists in dumping a generous layer of pebbles (locally known as "petrified kidneys") brought from the river beds and leaving it to the traffic to "work" them in, woe to the unwary cyclist who strikes such patches of a newly repaired road! Dry skidding on these stones is not pleasant. The absence of bridges, too, in the interior makes distant touring exciting and strenuous work, if not altogether impracticable at certain times of the year. Most wooden bridges spanning the rivers, which during the dry season are mere streams, but which swell into mighty rivers after a few days of torrential rain, are swept away and not replaced for months. There are also temporary toll bridges put up by villagers, who, with commendable foresight, take the precaution to pull them down when a heavy rainfall is anticipated and re-erect them when the danger



**Motor Cycling in Japan.—**

is over. The illustrations give a fair idea of a bridge of this description. It is on the fine military roads that the motorist may, in the absence of police traps, scorch to his heart's content. These roads are well engineered and maintained in good repair.

Artificial manuring has not yet been adopted by the Japanese farmer. He still adheres to the primitive methods of his forefathers, which appeal strongly to the olfactory organs of the European. Collectors of night soil from the neighbouring villages come in daily to the city, and to avoid the carts with their odoriferous loads as they wend their way homewards is not particularly in the absence of any rules of the road—an easy or pleasant task.

Few side walks, if any, exist outside the limits of the larger towns. The middle of the road is therefore the favourite playground of children and chickens, and the toot-toot of a motor horn or the crackle from the exhaust of a healthy single not only scatters them but brings fresh consignments from every lane and backyard.

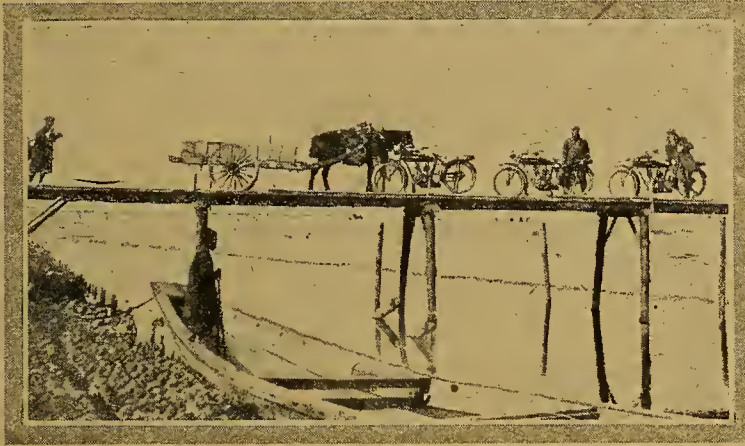
I notice in your columns that much controversy exists in regard to machines for Colonial use. I do

not know what Colonial conditions are like; but, speaking from experience of the vile roads in some parts of Japan, I consider a sprung frame, large wheels, and, say, 5in. to 6in. road clearance, a *sine qua non* for comfortable and safe travelling. I ride a popular American heavyweight twin with sprung frame and 28in. wheels fitted with 3in. tyres, and my companions, who ride standard British productions, often complain that they find it difficult to keep pace

with me on the terrible pot-hole roads, whereas I find little discomfort, my machine ticking gently over on the pilot jet at about 20 m.p.h. and riding over the holes and bumps without undue buck-jumping, the spring frame and large wheels and tyres, coupled with the heavy weight, enabling the machine to hug the ground and insulate the rider from the shocks. It is time the British makers realised the

necessity of building machines specially to meet the requirements of Colonists if they wish to check the American invasion. The Japanese favour British goods on account of their high quality; but this point is not everything, there are many other essential features to consider.

J.D.M.



A temporary toll bridge erected by the natives in place of the ordinary bridge swept away by torrential rains.

## A GREAT RIDE.

Transcontinental Trip of 3,296 Miles. "Ixon" on Four-cylinders.

ONE of the finest performances on a motor cycle has just been accomplished by an American rider, Alan T. Bedell, who, mounted upon a four-cylinder Henderson, rode from Los Angeles to New York in 7 days 16 hrs. 16 mins. From the Pacific to the Atlantic coasts is 3,296 miles, and the trip is a favourite form of "record," but Bedell's wonderful time beats all previous one-man attempts in any sort of vehicle.

Commenting upon the remarkable performance, "Ixon" writes: "The many readers who believe in the ultimate triumph of the four-cylinder principle on tourist machines will doubtless take unction to their souls as they read of the latest Henderson stunt. Mr. Alan T. Bedell has just ridden a 1917 model from the Pacific (Los Angeles) to the Atlantic (New York), a distance of 3,296 miles in 7 days 16 hrs. 16 mins., an average of 426 miles a day. Some of us have seen British riders after a six day stunt of 400 miles a day for six days on selected British roads, which are—or



Alan T. Bedell.

should I say 'were'?—appreciably better than American roads are on the average, and we do not envy Bedell. The last British rider who put up a ride of this type was in a fairly pitiable condition at the finish, and though I do not know the American coast to coast route, I suppose the job is far tougher than our own six-day records, and that without making any allowance for the extra forty hours in the saddle. To name one point only. Bedell must have ridden slowly for a large part of the distance, and, consequently, he must have spent more hours in the saddle. But the selection of a four-cylinder, with its multiplication of parts and of possibilities of small derangements, shows that the modern Henderson is some bicycle. I do not recollect a previous example of a four-cylinder doing anything really good in long distance work of a public character. If four cylinders are going to put up shows of this nature, we shall have to consider them more seriously when we plan our post-war de luxe models. I do not mind confessing that if I were set to tackle a job of this kind I should certainly select a single-cylinder for the sake of its substantial simplicity. But Bedell actually selects a four-cylinder, and then proceeds to knock nearly four days off the best motor cycle times."



## THE RED CROSS DRAW.

£3,200 received in Ticket Money. A Chat with the Khaki Winner.

**W**E were able to announce in our last issue the names and addresses of the holders of the winning numbers in the Red Cross draw, organised by the Newcastle (Staffs) British Red Cross Society.

We have received a very appreciative letter from the chairman of the Draw Committee, Councillor Sidney W. Carryer, who mentions that our readers subscribed about £400 worth of tickets. He goes on: "Miss Phyllis Carryer received thousands of very charming letters from your readers both at home and abroad. On behalf of the committee I wish to offer you our very best thanks for the splendid editorial references to the draw, the value of which have been fully appreciated by us."<sup>22</sup>

In all, twelve thousand letters were received in connection with the Newcastle (Staffs) Red Cross raffle, the total sum contributed for tickets being £3,200.

A charming little letter has been received from Miss Phyllis Carryer, who assisted her father in connection with the dozens of letters received each day, enclosing remittance for tickets. Its contents are addressed to our readers.

July 19th, 1917.

Dear Mr. Editor,—So many thousands of your readers have sent me such lovely letters wishing success to our Red Cross raffle for the Triumph motor cycle and the pony, and sent such a lot of money (about £400) for tickets, I want you through *The Motor Cycle* to thank them all, as there are far too many for me to write to myself, because I am only eight, and so many of them are soldiers or sailors they are sure to want a letter, so if you put it in your paper they will all see it. Also I want to thank you for your great kindness in helping us so much.

With best wishes to yourself and to all your readers,

With love from



Miss Phyllis Carryer.

PHYLLIS.

As soon as we heard that the  $2\frac{1}{4}$  h.p. Triumph motor bicycle which had been raffled by the British Red Cross Society's branch at Newcastle-under-Lyme had been won by Mr. A. F. Jakins, we hastened to call upon him, and found him at Durham House, Crouch Hill, London, N., an auxiliary hospital of which he is an inmate. It is interesting to record that Gunner Jakins joined the "Tanks" through *The Motor Cycle* last year, went through his training, and was in the "push" on September 15th, 1916, when the "Tanks" were first employed. They had to go into action in terrible weather and over surfaces which had never been anticipated in this country, yet his Tank, which has been many times in action, got through splendidly and was never stopped on any occasion. Unfortunately, the first time Gunner Jakins's Tank went over the top he was looking through a sight-hole when a bullet struck the edge, several portions of the splinter entering his face just below the lower eyelid of the left eye. However, he soon recovered from his wound and went into action again, and is now home suffering from a nervous breakdown and deafness.

He is an old motor cyclist, and has had a good deal of experience, as he has had about ten different machines. After his training at Bisley he was taken to a secret camp, when he learnt all about the monster with which he had to deal, and while at this place he rode a  $3\frac{1}{2}$  h.p. Rover, which he found to be a great blessing. That was in the days when petrol was plentiful. He has also ridden Douglas, Norton, Indian, Kerry-Abingdon, and Levis motor cycles.

Asked whether he had yet received delivery of his prize, Gunner Jakins replied that he had not, as he did not intend riding just at present, and did not think a motor bicycle would be much use to him. Moreover, his preference was for a  $3\frac{1}{2}$  h.p. T.T. model, and not a low-powered lightweight. Consequently he prefers to receive the prize in cash rather than kind.

## MOTOR CYCLE VOLUNTEERS.

Organisation of the Lancashire Forces.

**T**HERE was a time some two years ago when motor volunteers were looked upon by the majority as shirkers because many were young men who might well have been serving their country. This state of things no longer exists. The country has now the right to call upon all those of military age to serve in the Army, and if any man is still to be found in a civilian capacity it is because the authorities consider that he is better employed in that way. Then again, many volunteers (motor cyclists and others), are men over military age and consequently barred from service in the regular forces, though they may be active and energetic men. The fact that the volunteers are now recognised by Government and organised for home defence gives men of this most useful class an opportunity of rendering themselves efficient defenders of their native land.

Some few weeks ago we published an account of the Lancashire Volunteer meeting at Blackpool. The Lancashire Volunteers are now divided into three groups with Manchester, Liverpool, and Blackburn as centres, and are under the command of the County Commandant. Col. Smith has now been gazetted temporary colonel, Major Rigby, the county adjutant, temporary major, and the adjutant of No. 1 group has been gazetted captain. The motor cyclists are maintained at a strength of sixty, notwithstanding the calls of the Army. The men are just settling down after the reorganisation caused by the official recognition and necessary change from the old method of working to the War Office requirements. Each motor cycle section now has a sergeant, corporal, and lance-corporal, but there is no allowance for specialist motor cycle officers.



# THE Critic

## Fireside Chats on Motor Cycle Problems

### Which gives the Higher B.H.P. — Two or Four-stroke?

"THIS," said the D.R., "was one of the stock arguments used to beguile away the hours by a certain little group of D.R.'s when the eternal monotony of trench warfare first began." "We never quite settled the question," added the Discharged Soldier, knocking out his pipe. "Some of the boys backed the four-stroke—others the two. Among us was a Scott T.T. rider, who used the Scott as a fearsome weapon, and we left the question as we found it, still unsettled." "Which did you back?" queried the Journalist.

The D.R. was cautious. He said that his views on the subject were rather flexible, but that, on the whole, he backed the two-stroke.

"Then you were wrong," bluntly stated the Manufacturer. "An R.F.C. officer asked me the same question a week or two ago, and I told him without hesitation that the four was the more powerful. I took that as an admitted fact."

"Why?" queried the D.R. "Because everything points towards it. Take public competitions, for instance. Has a two-stroke of the same c.c. achieved the results that many of the fours have achieved? More than one 2½ h.p. four-stroke has done 60 m.p.h. at Brooklands."

#### Two-strokes and the T.T.

"I admit all that," stated the D.R. "I admit that a four-stroke can be built fairly to 'eat up' a two-stroke of the same c.c. It can be fitted with overhead valves, for instance, and specially designed and tuned for racing, whereas the designer and tuner of the two-stroke has a very limited scope. He is dealing with an engine which is more of a compromise, and he is up against certain difficulties which only time will remove. He cannot improve his scavenging beyond a certain point, for instance, or draw a gigantic gulp into his small engine—things that are comparatively easy to perform in the case of the 'four.' But my point is this—you take a dozen two-strokes and a dozen four-strokes off the road, and I'll bet you the two-strokes will knock the four-strokes clean off the map. Please lend me a match."

The Manufacturer, fumbling absently in his pocket, produced a match-box and handed it over, remarking, "You contend that the four-stroke scores simply because it can be built and designed for speed to an extent which is impossible in the case of the two-stroke. Is that so?"

The D.R. agreed rather shakily—that it was.

"Then," announced the Manufacturer, "your argument is knocked absolutely

sideways by the practical demonstration afforded by the Scott, to which you have already alluded. Did not the Scott win the T.T. on two occasions and establish fastest lap on another? Was not that the result of a specially designed engine and of special tuning? The four-strokes were given the same attention, yet they were beaten by the two-strokes. Was not that so?"

"It was," agreed the Novice. "Which seems rather to defeat your own argument that a four-stroke is more powerful than a two-stroke."

"No, no!" protested the Manufacturer. "I do not under-estimate the value of the T.T., but everyone knows that it was won not necessarily by the best engine, but by the best combination of luck, rider, engine, and machine. I have merely used the Scott to show to the D.R. that the scope of the designer is no more limited in the case of a two-stroke than in the case of a four-stroke. And everyone knows that it was not only the excellent engine, but the marvellous controllability of the Scott machine, coupled with marvellous riding, which won the T.T."

#### Touring and Trials.

This seemed very reasonable and sensible, and the D.R. had nothing pressingly urgent to say, so that he was glad when the Journalist chipped in.

"I agree with the D.R. that in freak engines the four-stroke permits more scope than the two," he said. "Because one ingenious designer of a two happens to have carried off the T.T. seems to me to signify nothing. Have not four-strokes won the T.T.? But, talking about freak engines—"

"What about the 85×60 mm. J.A.P.?" the Manufacturer interposed for him. "The machine that Harry Martin has used for years. I tell you, the four-stroke wins hands down. Compared with a 'fluffy' two-stroke, the four-stroke has 'kick' and 'snap' about it."

"But the two-stroke is the more powerful in touring practice," put in the Novice. "That is the only thing that matters to me, and men of my stamp compose 90% of the purchasing public."

The D.R. agreed that the Novice certainly was an ordinary—very ordinary—juggins, and that therefore his opinion ought to carry some weight. "It is for such blithering idiots," announced the D.R., rudely, "that motor cycles are designed. The world is composed of them, and the manufacturer has to cater for the world—not for the individual."

"Look here," said the Manufacturer, "you are all trying to evade the point of public competition, which is the only

thing that carries any weight. You can talk about the two-stroke being better than the four in the hands of the private owner, but where is your convincing proof? One of the most striking examples of the superiority of the four-stroke was afforded by the last A.C.U. Six Days Trials, when Neville Hall rode a 2 h.p. O.K. fitted with an Albion three-speed countershaft gear."

#### Modern Progress.

"Hm," scoffed the D.R. "I used to have a 2½ h.p. four-stroke, which I used for blinding into Scotland—120 miles—to see my best girl. During the week-end I used to keep the girl busy holding little oily bits, while I took out the valves, etc., for grinding, so that I could get home on Monday and avoid the sack. The girl got sick of the job, but if I had possessed in those days a modern two-stroke of the same c.c., then—no telling what might have happened."

"Just so," agreed the Manufacturer, "and if you had possessed a modern four-stroke of the same c.c., the Celtic accent might flavour the conversation of your children. I defy you, or any other man, to burn out the valves of a modern four-stroke in 120 miles. I bet the modern four-stroke lightweight of that power would tire you to a standstill ere you affected its polish! We know a little bit more about metallurgy now, and modern valves will maintain their condition for an indefinable period."

"Where is your two-stroke that has held its end up against the A.J.S. lightweight?" queried the Journalist.

"Have not yet found it," admitted the D.R. "In the 1913 trials I was riding a 3½ h.p. single, renowned for its unfailing engine, and more than once that year the little A.J.S. left me standing. It was almost like a death blow when Wolverhampton gave up making it, and the same applies to the little Sunbeam. Still, I hold out that the two-stroke is the better engine in the hands of the ordinary rider. I have never tried a small four that could hold a candle to my last two-stroke, a Velocette, as a no-trouble economy mount."

Thereafter argument pivoted round the central point. The two-stroke, owing to its present inefficient oiling, etc., required decarbonising at appallingly close intervals. The four-stroke had valves, valve clutch, and valve adjustment, which required mechanical judgment. Finally, it was decided that undoubtedly the two-stroke would triumph, but that, as concerned the argument, the four-stroke is, to-day, more powerful on the b.h.p. test than the two.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

### TWO-STROKE PISTON RINGS.

Sir,—If "Piston Rings" will try the use of Oildag in his Junior Triumph I am sure that he will be pleased with the results.

I have used it on three different makes of two-strokes, and have yet to experience a "stuck-up" top ring.

The rings on the piston of my last  $2\frac{1}{2}$  h.p. Villiers were beautifully free and bright after 2,000 miles running, and had never been touched, although the other parts of the engine had been decarbonised three times in that distance.

For some reason or other I find that Oildag is of no use if mixed with Wakefield Castrol. SAFRICAN.  
Colne.

### PETROL PERMITS.

Sir,—There seems to be great scarcity of petrol, when applications are made for purchasing permits, to some motorists. I say "some" advisedly, as in this district I know of people who can run about to their hearts' content, and on pleasure trips at that. No doubt they are connected with firms doing "munition work," but surely it is time to put an end to their supplies when even any of the petrol is used to motor around the wives, families, and friends of these. They may also get petrol at less than "full duty"; I do not know, but if any difference is to be made in the duty charged it should surely be full duty to those who are making money out of its use! To apply for petrol for business, and use it, or any of it, for other running, is a low enough thing, and people who do this have simply no decency. But they should not be allowed to misuse this privilege, and it is time—high time—action should be taken against them by the petrol authorities. I can name several who are pleasure motoring regularly.

Surely something could be done if complaint were made in the proper quarter. WISHAW.  
WILLING TO HELP.

### INVERTED CONTROL LEVERS.

Sir,—I wonder if the anatomical aspect of the vexed question, "Inverted control levers," has occurred to any of your readers who favour this form of valve lifter and front brake control? Take either of these two levers and work it several times until the hand becomes fatigued, and then consider where the fatigue is felt the most. With the inverted lever the hard work of pulling it up falls on the weakest portion of the operating hand, namely, the third and fourth fingers, whilst the strong portion of the hand—the thumb and first two fingers—have an easy time.

In consequence, the inverted is a more tiring form of lever to work, and is not so conducive to delicacy of control. Anyone who doubts this can experiment with his front wheel brake for delicacy of control, on a stretch of slightly greasy sets. My present mount is afflicted with a pair of these inverted levers, and, apart from their utter inaccessibility, their discomfort is such that never again will a machine of mine be equipped with them. Perhaps when their devotees use them for their h.b.c. clutch operation a realisation of their inherent defects will come to them. The entire contour of the normal type Bowden lever gives the complex muscle system of the hand a correctly graduated load, an eminently desirable attribute.

Finally, the riders who require lever hooks on the end of their handle-bars to anchor themselves to their machines should revert to pedestrianism or travel by train. My congratulations to "Chinook" for his castigation of the inverted type. A. LINDSAY (Capt. R.A.M.C.)

B.E.F.

### SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—As a reader of *The Motor Cycle* since the appearance of its first number, and as a rider of various makes of motor cycles since 1902, will you let me poke my finger in the "pie" with regard to the absorbing topic of "singles v. flat twins"?

Well, until the autumn of 1915 I had never had any real experience of "flat twins," but after joining the M.T. and coming out here, with thirteen flat twins, one of which was of the 4 h.p. type, I have gained much useful knowledge, especially from a Colonial's point of view. For thirteen months on the Somme front, on roads that at many times defy description, nothing could produce a more severe trial for any type of machine, and my opinion now is, that a small flat twin on these roads will, with care, last a year and run about 9,000 miles before it requires practically entirely renewing; the reason for this being that  $2\frac{1}{2}$  h.p. is not sufficient power, and 50% of the 9,000 miles is done on low gear, and this, combined with mud and dust, is sufficient to wear a high revolving engine out after a comparatively short life. Then, in consequence of much low gear work and high revolving, we get a considerable amount of magneto and plug trouble. The single-cylinder turning over at half the speed lasts, therefore, quite twice as long, and with less attention.

Now, as to engine balance, there is no doubt that the flat twin scores at high speeds on good roads; but out here engine vibration is quite drowned by the road vibration, and under these conditions my experience is that the heavier machine is infinitely more comfortable to ride, for its weight and better springing keep it to the road, while the little light machine is tossing about like a rowboat on a choppy sea, which results in many cases in broken front springs or broken frames. I personally have had three frames break under me, and I scale only 10 stone.

For the last month or so I have once more been riding a good old  $3\frac{1}{2}$  h.p. single that has seen a year and a half's work out here, and the engine seems as good as ever and the frame is still sound, in spite of the fact that the machine used to be ridden by an ex-trade rider, who rode fast and furiously, besides having done a turn up at the battery, where it had been used as a "hack" by R.G.A. men and officers. Therefore, until something much better in the way of flat twins comes along I stick to the  $3\frac{1}{2}$  h.p. single.

One more comment, and that is that, owing to so much low gear work on the small flat twin, the petrol consumption out here in any case is greater than on a single  $3\frac{1}{2}$  h.p., for obvious reasons.

I said that when my company came out here just over a year ago we brought thirteen flat twins with us. Out of these we have two left—one a  $2\frac{1}{2}$  h.p., the other a 4 h.p. model. All the rest have been evacuated.

I may say that I have nothing to do with the motor trade, and therefore have no "axe to grind."

B.E.F.

ROAD OFFICER.

### AVERAGE SPEEDS.

Sir,—I do not wish to be unduly pedantic, but, in the interests of accuracy, I should like to point out that the contributor of the article on the Blackburne engine in your issue of last week is guilty of an error.

Speaking of the efficacy of flywheels, he says: "20 lb. at a 3in. radius being equivalent to 10 lb. and a radius of 6in. so far as torque is concerned."

This is wrong. The efficacy of a flywheel depends on its "moment of inertia," which is equal to the product of its mass and the square of its radius of gyration, which



latter may conveniently be described as the "mean effective radius" of its mass distribution. Thus 10 lb. at 6in. radius is four times as effective as 10 lb. at 3in. radius, or twice as effective as 20 lb. at 3in. radius, and not equivalent thereto.

Again, as a lover of accuracy, let me thank you for the very intelligent remarks of "The Critics" on average speeds. Most men are liars in this respect, and I well know that to average anything over thirty means very hard riding indeed, and even the thirty mark needs some reaching. But I have done forty-five on a T.T. Douglas for a short distance after much tuning, but it is not common.

W. WHATELY SMITH.

Sir,—“The Critics” in your issue of July 19th make me wonder if the individuals mentioned have ever tried the effect of a little attention to the mechanical details of their machines when making average speed tests.

I agree with them that the majority of  $3\frac{1}{2}$  h.p. machines in use will not do 45 m.p.h., but that is the fault of the riders and not of the machines. Some time ago I made a trip from a place called Arneke to St. Omer (France) on a  $2\frac{3}{4}$  h.p. machine, timed with a stop-watch, and the distance (twenty-three and threequarter miles) measured off an Army map, the average speed being 47.85 m.p.h. At the end of the run, without any attention whatever to the machine, a kilometre was covered in 42s. (52.3 m.p.h.) This on a standard machine tuned as well as was possible for a Div. Sig. Co. D.R.

ARMIDUG.

Lewisham.

[Our correspondent has missed the point of the discussion to which he alludes. This was intended to show that the high average speeds over fair distances—say, London to Exeter at 45 m.p.h., sometimes claimed—were impossible. It was not suggested that a well-tuned machine was not capable of a high speed over a short distance on a good road. A Douglas has covered a kilometre and mile at speeds of over 72½ and 70 m.p.h. respectively, but an average of 45 m.p.h. for a considerable distance over most roads is a crime.—ED.]

#### CURIOUS FACTS.

Sir,—Under this paragraph heading in “The Critics,” July 12th issue, the Journalist says: “Let me tell you one or two facts . . . that may surprise you. A car is more economical for the weight it carries than a motor cycle . . . Why? Because a motor cycle is over-engineered and does not make the best of its engine.”

Although the first italicised statement may be taken, generally speaking, as correct, I submit that the answer to the query “Why?” is absolutely wide of the mark.

Comparing the performance of a motor cycle with that of a car. Given loaded weight motor cycle=3 cwt. and m.p.g.=100; given loaded weight motor car=25 cwt. and m.p.g.=20. Then performance of motor cycle=15 ton miles per gallon and performance of motor car=25 ton miles.

This bears out the statement that the car is more economical for the weight it carries.

Let us, however, examine further the relative performances of the motor cycle and the car. In each case the total external load of the engine is made up of (1) weight moving, (2) overcoming air resistance. Say windage area of motor cycle= $4\frac{1}{2}$  sq. feet and windage area of motor car =11 sq. feet. The engine of the motor cycle propels the vehicle against a certain air resistance, due to area ( $4\frac{1}{2}$  sq. feet) exposed, for 100 miles, in addition to drawing 3 cwt.—all for the expenditure of one gallon of petrol.

The performance of the motor cycle on the air resistance account may be expressed as  $4\frac{1}{2} \times 100 = 450$  units per gallon. Similarly the car performance (11 sq. feet windage 20 m.p.g.) may be expressed as  $11 \times 20 = 220$  units per gallon.

Thus the total performances of the two can be written: Motor cycle (15 ton miles+450 unit air resistance miles) per gallon; motor car (25 ton miles+220 unit air resistance miles) per gallon.

It is not necessary here to enter into the very involved process of reducing “ton miles” and “unit air resistance miles” to a common value; it is sufficient to state that any deficiency of the motor cycle in weight carrying is made up for by an overplus in overcoming air resistance, and that the relative total performances of the motor cycle and car per gallon of fuel consumed are practically identical.

The fallacy of the statement that the motor cycle is over-engineered is therefore easily seen from the above. Perhaps the fact may be emphasised by the following. In the above cases suppose motor cycle to be  $3\frac{1}{2}$  h.p. and motor car to be 20 h.p., then windage area of motor cycle= $4\frac{1}{2} = 1.2$  sq. foot per horse-power, and windage area of motor car= $11 = .55$  sq. foot per horse-power. Suppose the horse-power of motor cycle is increased to 8.18 h.p., then the windage area exposed= $4\frac{1}{2} = .55$  sq. foot per horse-power—the same as in the case of the car.

Now if the motor cycle were loaded up to 10 cwt. we should certainly expect it to run 50 miles per gallon, in view of the performances of the many light cars about. This would bring its performance,  $\frac{1}{2}$  ton, distance 50 miles, to 25 ton miles per gallon, i.e., same as the car.

We therefore come to the conclusion that, taking into consideration its windage area, the motor cycle for weight drawing purposes is under-engineered as compared with the car.

ENGRO.

Baldon, Yorks.

#### PETROL FILTERS AND DIVIDED TANKS.

Sir,—I saw in one of the motor journals some few weeks ago that, according to Capt. B. C. Hucks, “dirt in the petrol” was a far too common cause of engine stoppage whilst pilots were up in the air, particularly in trying new machines.

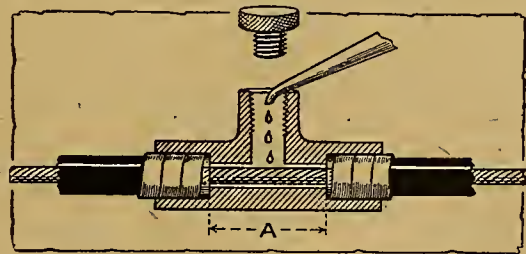
A pilot may not be able to see that his petrol is strained when his tank is filled; but if he had a 4in. circular filter fitted in an accessible position, with a detachable screwed top, he could quickly satisfy himself whether that was clean and capable of straining all the petrol in his tank.

There is another danger which should be guarded against, if it is not already done: Aeroplanes in action frequently have their tanks punctured by shrapnel or machine gun fire. Petrol tanks could be constructed in separate compartments, with the dividing wall forming a complete separation, and a filler cap to each compartment; or the dividing wall could be brought to within an inch or two of the top of the tank, with a common filler cap for all compartments. A pipe could then be taken from each compartment to the large filter previously suggested, and with a tank so constructed, unless it were hit directly at either end, puncturing the whole of the compartments, sufficient petrol would remain in the undamaged parts to carry the machine back to earth, as a frontal or angular hit would leave some few tanks still unpunctured.

B. C. WOODWARD.

#### LUBRICATING BOWDEN WIRES.

Sir,—Regarding the matter mentioned by “The Critics” in the issue of July 5th, does not the whole trouble of breakages arise from difficulty of lubricating the inner cable? I enclose a sketch of a method I have used for some years, riding every day, in all weathers, without a broken wire.



A—means of lubricating the inner cable

Also, why cannot the outside levers be fixed to the bar by small studs and nuts, similar to those on the  $2\frac{3}{4}$  h.p. Douglas?—then they cannot twist on the bar.

If manufacturers will insist on fitting inverted levers for neatness, then they should provide some method of lubricating the wire for the first foot from the lever and not trust to oil running uphill to do it. All breakages seem to start in that distance.

These were fitted on the highest point of the casing, which was cut and shortened by the amount A. Ends were wrapped with insulating tape.

YORKS.

Denmark Hill.



## AN APPRECIATION OF THE P. AND M.

Sir,—I can thoroughly endorse the statement of Mr. B. Marians as to the speed capabilities of the P. and M. solo mount when geared 4.8 to 1. On one of my machines out here I accomplished a ride of 56½ miles (by speedometer on six-cylinder Daimler) in 1h. 40m., starting at 5.30 a.m., and arriving at my destination at 7.10 a.m. This is an average speed of 34 m.p.h. The only alterations from standard were: long exhaust pipe dispensing with standard silencer, B. and B. long air inlet, extra air valve, and Lodge Aero single-point plug. Thirty miles of the journey was over indifferent *parcé*. The engine, I consider, is the most powerful and coolest running 3½ h.p. that I know. In conclusion, I must state that I have no connection with the firm of Phelon and Moore, except as a very satisfied user of their products.

B.E.F.

1712, R.F.C.

## BRITISH MAGNETOS.

Sir,—Now that the day of the German magneto is over and the British instrument has come into its own, I venture to point out a slight improvement that I suggest should be incorporated on all models.

The parts to which I refer are the aluminium end plates. These in several cases have many excrescences, such as flanges round the circumference and embossed initial letters denoting the make of the instrument.

Now personally I think nothing is more pleasing to the eye than a polished aluminium surface, and these excrescences to which I have referred prevent the magneto being easily cleaned. The Bosch has no protuberances, and when polished is only marred by the word "Bosch" incised on the aluminium.

I should like to add that I am the satisfied owner of a British M.L. magneto.

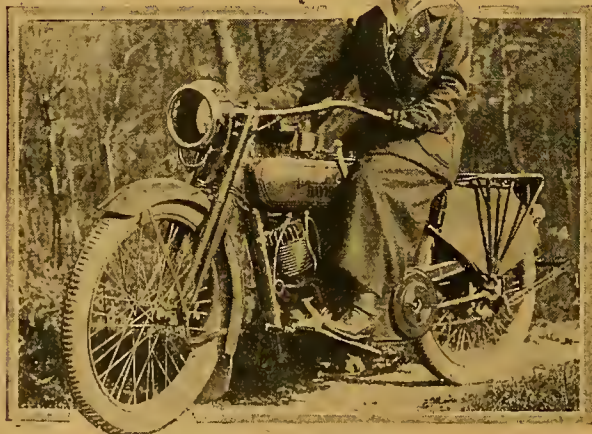
P. GROVE.

## AMERICAN GIRL RIDERS.

Sir,—The writer has just finished reading your issue of May 17th, and was pleased to see a note on page 449 telling of the activities of Milwaukee motor cycle riders in assisting the local military officers to carry out Government orders that all wireless stations be dismantled.

There is an interesting sequel to your story. Two of the motor cyclists who took part in this search for radio outfits in Milwaukee were girl drivers, the Misses Crystal Haydel and Lillian Harwin, both of whom are veteran motor cyclists, and both honorary members of the Milwaukee Motor Cycle Club. Over here we make our lady drivers honorary members, which relieves them of the payment of any dues, but obliges them to act as chaperones and hostesses when the club has any social doings in its quarters.

Miss Lillian Harwin, on her 7-9 h.p. Harley-Davidson.



Thinking that some of your lady riders might be interested in seeing a typical American girl rider, I am sending herewith a photograph of Miss Harwin.

Two days after the Milwaukee motor cyclists made their reports and all the radio outfits in the city had been dismantled, Miss Harwin received an anonymous note, apparently written by the owner of a station in one of our

suburbs, which read as follows: "My dear Miss Harwin,—There are radiograms, heliograms, and pigeongrams," indicating that the writer wanted her to know that the action of Milwaukee motor cycle owners in helping to put all wireless outfits out of commission did not prevent the owners from using other means to transmit messages. Miss Harwin turned the note over to the proper authorities for investigation.

HUGH SHARP,

Secretary Milwaukee Motor Cycle Club.

## NON-RUSTABLE STEEL.

Sir,—Our company mess rejoices in the possession of a set of knives which will not rust, stain, or tarnish, however maltreated. No doubt you have met the sort I mean. Now, I do not know all the physical properties of the steel used in them—perhaps it is unsuitable for other purposes than making knife blades; perhaps, moreover, it is prohibitively expensive, though the knives are a reasonable price—but, if there is any possibility of it, I am sure a great number of motor cyclists would put up with considerable extra weight and extra cost if they could get a motor cycle made of polished steel, unplated and unpolished, which would never lose its shining surface, in spite of weather and ill-treatment.

Perhaps some of your readers who know more than I do about the properties and possibilities of this remarkable metal can tell us if my suggestion is in any way practicable.

B.E.F.

P.A.L.

## SIDECAR AND REAR LIGHTS

Sir,—It might be of interest to some of your many readers who use sidecar outfits, and at the same time experience trouble with rear lights, that some time ago I purchased an ordinary pedal cycle model Voltalite, which I fitted to my Matchless sidecar outfit for the purpose of complying with the Lighting Orders regarding sidecar and rear lighting. This wonderful little machine, after being strengthened and adapted to suit my front forks to drive off the front wheel rim, has filled the bill quite beyond my expectations. Indeed, it has given no trouble at all, but always a steady reliable light, calling for no more attention than a spot of oil occasionally at the proper ducts provided. I use an acetylene head lamp on the motor cycle and the little Voltalite head lamp on the sidecar with its steady rear light. I must have saved its cost in carbide alone, not to mention the trouble and accompanying unpleasantness. I use my machine all weathers and do a good deal of night riding in the winter. If this little Voltalite is fitted with a little thought and care any sidecarist will appreciate a good lighting apparatus as I do. I would add the usual disclaimer, and as I bought it at an agent's I do not even know the makers' address. I was, however, assured it was absolutely British, and it is marked to that effect.

I shall continue to read your splendid paper even if you are forced to put the price up to sixpence.

Lymington.

GLOW WORM.

## SHOCK ABSORBERS.

Sir,—With reference to the article by "Chinook," I have often wondered why, in the case of an outside flywheeled engine, a shock absorber has not been placed in the flywheel boss itself, insulating the rim of the flywheel from the crankshaft.

The sprocket could be fixed to the flywheel. I should suggest a shock absorber similar to the cush hub, with blocks of rubber or springs between the radial arms which project from the crankshaft and flywheel. Perhaps a combination of both, medium strength springs to take the lighter shocks and the rubber blocks to come into operation after a slight amount of movement to take the heavier shocks.

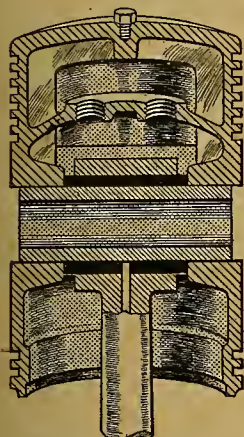
Take an instance of a high compression single pulling hard on a high gear. When the engine fires, an enormous pressure is transmitted through the big end to the flywheel. The result is the flywheel is suddenly accelerated; naturally this sudden acceleration of the flywheel takes more insulating from the transmission than the explosion pressure would from the flywheel. It would ease the dead shock to the big end bearing, and tend towards a more even torque, as this sudden acceleration on the power stroke would not be lost, as in a slipping clutch, but would be stored up in the springs and blocks to be used on the three idle strokes.

FLYWHEEL, A.S.C., M.T.

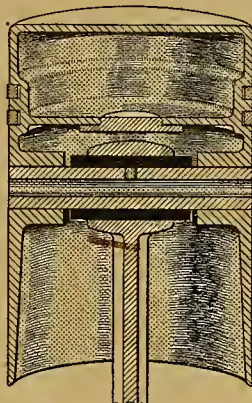


# THE HOTTEST PART OF THE ENGINE.

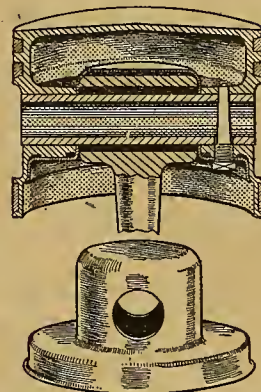
The Heat of the Piston Head and its Effect upon Lubrication.



A piston having a false head, above the gudgeon-pin bearing. Hot oil is thus prevented from being splashed on to the hot underside of the piston head. The piston was designed for a 400 h.p. four-cylinder gas engine by Mr. F. G. Hatch



A design patented by Mr. D. A. Pearson. The diaphragm above the gudgeon-pin is cast with the piston, the objects being to increase crank case compression (in two-stroke engines) and to prevent oil splashing into the interior of the piston.



A piston having a thin sheet metal shell or cup which surrounds the small end of the connecting rod except on the lower side. Oil has free access to the bearing, but at the same time it is prevented from being thrown on to the inside of the piston head.

ON July 14th *The Autocar* published a most interesting and instructive article on the subject of deterioration and carbonisation of the oil in the crank case by contact with the hot (possibly red hot) piston head, and the means taken to prevent this by making pistons with double heads, and so rendering this destructive contact impossible. Three pistons designed with this end in view are shown on this page, and below we give some extracts likely to prove interesting to motor cyclists from the article to which we have referred. *The Autocar* says:

When the oil is withdrawn from the crank chamber after any considerable period of use, it is always found to be dirty. Part of this foreign matter in used lubricating oil consists of what on analysis proves to be road dust, but there is a great deal besides road dust which contaminates the oil of an internal combustion engine.

If the air as it enters an engine be filtered and so freed to a large extent from dust particles, it will nevertheless be found that the oil in the crank chamber will soon become very black. The real reason for this is that the average engine is a soot-making mechanism, and most of the soot in the oil is made on the underside of the piston, where the oil splashes up from the crank chamber and is rapidly roasted and carbonised, forming soot which is washed down by the continual splashing of oil, this oil in its turn being again made into soot and washed down into the base chamber. In fact, this means that the engine is lubricated not with oil alone but with oil and carbon particles.

If the oil could be kept from the piston head, a great deal of needless wear would be saved to all the working parts of the engine, because the oil would be cooler and cleaner. Less lubricating oil would be used.

The really important advantage is the saving of wear and tear, not merely because the oil is kept free

from carbon particles, but because its temperature is kept so much lower, and it therefore not only lubricates the bearings better but keeps them cooler.

It is too often assumed that the heating up of the lubricating oil is due merely to the hot cylinder walls, but while they undoubtedly are hot, it must be remembered that the heat is carried away by the radiating fins, and consequently they are nothing like so hot as the piston. The latter is hottest at its centre, because that portion is furthest from the cylinder walls and the heat is not conveyed away sufficiently fast to the comparatively cool cylinder walls to give uniform temperature to the piston. The hot spot is, therefore, always in the middle.

Under severe stress, such as a long period of full open throttle, there is little doubt that the middle of the piston is red hot. This effect can actually be seen on large horizontal gas engines which run with an exposed connecting rod, so that one can actually look into the inside of the piston when the engine is working.

## A Severe Test.

*The Autocar* then mentions a 400 h.p. four-cylinder gas engine built by Messrs. Brown, Lindley, and Co., of Patricroft, which is fitted with a double-ended piston, and has proved so successful that even after twenty-four hours' running at full load the temperature of the oil did not exceed 140° to 150° Fahr. In other words, this engine, the design of Mr. F. G. Hatch, running indoors for a period of twenty-four hours at a time, was keeping its oil some 20° to 30° cooler than is often the case in the crank chamber of a motor car after an hour's run on a warm day with a constant current of air under the oil sump.

Mr. Hatch's study of the subject dates back over eleven years, and was commenced at the time he designed a vertical two-cylinder gas engine exhibited at the Royal Agricultural Show at Derby in June of



### The Hottest Part of the Engine.—

r896 by the makers, Messrs. E. S. Hindley and Sons. The oil consumption was not satisfactory, and was found to be very much in excess of that of horizontal engines of similar power, and eventually a splash system was introduced almost exactly the same as that still common on many motor cars, as small pins  $\frac{1}{8}$  in. in diameter projected from the big ends and caught the oil in the crank case, throwing it up to the bearings and cylinder walls. Plates were fitted over the mouths of the cylinders slotted to permit the passing of the connecting rods. Even then it was found that the pistons on the underside of the head quickly obtained a coating of carbonised oil which reached a depth of half an inch, while the temperature in the crank case oil frequently exceeded  $170^{\circ}$  Fahr.

### Experimental Designs.

Subsequently a small engine was designed with a short piston, the casting being continued at a reduced diameter to a lower piston which acted as a cross-head guide. The result of this long dumb-bell piston, which was really two pistons connected by a waist of smaller diameter, was such that there was very little likelihood of oil reaching the hot underside of the piston head under ordinary conditions of running, and the oil in the crank case never rose above  $120^{\circ}$ , and the loss of oil was practically negligible.

The comparison of these two designs brought about the natural conclusion that a great deal of oil was lost by vaporisation caused by the heat of the piston top; also that the excess of oil found on the comparatively cool cylinder walls of the usual type of engine was in reality condensed oil vapour.

The long dumb-bell type of piston, apart from certain other objections which need not be cited, was obviously more expensive to make than the simple ordinary trunk piston such as is used on motor cars and gas engines, and the problem, therefore, was to obviate the excessive oil temperature of the ordinary design. It was thought that if the temperature of the oil could be kept at or below the temperature of the engine cooling water—that is, at or below the temperature of the cylinder walls—this vaporisation would cease, and with forced lubrication the little oil which reached the cylinder walls could be dealt with by scraper rings at the bottom of the piston. It was also thought that the loss of oil vapour through the vent pipe or breather from the crank chamber would be largely obviated.

It was shown about this time (eight or nine years ago) that the actual flow of heat from the hot centre of the piston was to the cylinder walls, and that the cooling was almost entirely due to this cause. In other words, the radiation of heat through the air in the crank chamber was of very small help, as Prof. Bernard Hopkinson, of Cambridge, had shown by his experiments that when this radiation was stopped by packing the underside of a piston with slag wool, a non-conductor of heat, its heat was only increased 2%.

It is necessary to mention here that Mr. Hatch is exceedingly anxious that there should be no delusions on this matter. While he very properly regards the keeping of oil from the hot undersides of the piston heads as most important, yet he points out that in his experience he has found that oil consumption is enormously affected by factors altogether separate from

oil temperature, by far the most important of which is the quality of iron from which the cylinders are cast.

No one supposes that all the oil reaching the hot piston head is carbonised, and therefore it is that which falls back into the crank chamber which raises the temperature of the whole bulk so rapidly. Much of it, too, is vaporised, and condensed on the comparatively cool cylinder walls, thus over-lubricating them.

In a comparative test taken with the same engine with and without the dummy piston heads a difference of no less than  $43^{\circ}$  Fahr. was found on a six-hour run. Without the dummy heads the temperature of the oil in the engine reached  $170^{\circ}$ . With the dummy heads it only got up to  $127^{\circ}$ , so that the advantages of the protection of the oil from touching the hot piston heads are twofold. We not only get the greatly reduced temperature, but the oil itself is kept free from carbon. Cooler oil and cleaner oil are advantages worth striving for.

We doubt whether the temperatures are as high in a small high speed engine as in a big gas engine, but we have no data at the moment to tell us whether with such dimensions of pistons as are used in motor cars the head ever reaches a temperature as high as  $400^{\circ}$  Cent. We should be inclined to say that it never did, except under conditions such as would obtain in racing or in aeroplane engines, but the fact remains that this is the hot spot of every engine, and, although it may not be so high as  $400^{\circ}$  Cent., it is very much hotter than any other part of the engine with which the oil comes in contact.

The hot spot in the piston necessarily has a very great effect on the temperature of the crank case oil, which in long trips loses its viscosity, and is undoubtedly less satisfactory as a lubricant and a bearing cooling medium, quite apart from the fact that the constant burning of it on the underside of the piston causes a continual rain of small carbon flakes into the crank chamber.

### A Motor Cycle Piston.

In conclusion, as an instance of the heat to which pistons may attain in motor car engines when long periods of full load running are done, we may cite the experience of Mr. Louis Coatalen with some of his racing Sunbeams when he first essayed the manufacture of steel pistons. These became so hot that the slightly domed piston heads assumed a concave form, and we imagine they would scarcely have done this at a lower temperature than  $400^{\circ}$  Cent.

Mr. Coatalen overcame the difficulty by placing a support under the piston head, bearing upon the gudgeon pin. This was quite successful in preventing further serious distortion of the piston, but it had the objection of conveying more heat to the gudgeon pin bearing, though in practice there was no trouble due to overheated little ends.

It should be noted in reference to fig. 2 that the object of the inventor, Mr. D. A. Pearson, of the Peco Co., was to increase crank case compression in a two-stroke engine, and we may say that in this respect other inventions of a somewhat similar nature have been patented, but as the intention of the inventors of these has apparently been entirely centred upon the idea of increasing crank case compression, there is no need to deal with them.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## Irregular Firing.

I have a 1910 5.6 h.p. V twin motor cycle. I have much trouble with the back cylinder. The front one will start up the first turn, but the back one will not fire at all, although there is a good spark. The valves are of the overhead type. I have changed the front valve and put it into the back and the back into the front, and have done likewise with the plugs, without any success. The carburetter is a B. and B. I have had a No. 32 jet in, but I have now put a No. 31 in.—J.W.W.

The carbon brush leading to the back cylinder may be cracked, or there may be an air leak at the front cylinder induction union. Test the plugs for weakness by changing them over. Make sure the valves are free in their guides and the tappets properly adjusted. Air leakage, whether in the induction system or past the inlet valve stem, is most probably the cause of your trouble.

## Partial Seizure.

I should be very grateful for your advice on the following matter: I have a  $4\frac{1}{2}$  h.p. 1912 three-speed Quadrant with side-car, which ran well until I fitted a new cylinder and overhauled it: (1.) Thinking the carburetter was at fault, I fitted a new B. and B. semi-automatic. The engine starts fairly well and will run all right on the stand, but when on the road will pull badly for about ten miles, then suddenly pick up and run as it should do until I get to a hill, when the machine gradually loses power, getting very hot. On one occasion it got hot and stopped, but on restarting ran all right for seventy miles without a stop, but I could not do it on the return journey. The engine takes plenty of oil, and it runs on petrol. I have tried three different plugs—two Lodge and one Bosch—taken off the extension pipe from the cylinder, fitted new rings, and ground the piston in the cylinder. The rings are a rather loose fit in the grooves. The compression is good. (2.) The big end bearing has worked loose, giving about  $\frac{1}{4}$  in. side lash. Will that hurt the engine? There is no play up and down.—G.E.

(3.) Without a personal examination of the machine it is very difficult to say what causes the overheating, but we should be inclined to think that as the engine has been recently fitted with a new cylinder and piston rings and piston

are too tight a fit in the cylinder. They may be loose in the grooves and yet touch at the slots, in which case when the engine got hot they would try to expand, and tend to cause a seizure of the piston. (2.) We presume that when you refer to  $\frac{1}{4}$  in. side lash you mean that when the cylinder is removed and the connecting rod is held at the top and moved sideways there is  $\frac{1}{4}$  in. of movement at that point. If so, it is not an unusual amount; but if the  $\frac{1}{4}$  in. you refer to is where the connecting rod big end bearing works on the crank pin, then it is excessive.

## Renovating an Old Machine.

(1.) The carburetter of my 50<sup>0</sup> 5.6 h.p. twin Rex is very much battered and leaky. Could you recommend me a make most suitable for my engine, as I am contemplating buying a new one. (2.) What is the cause of the engine overheating after it has been running for two or three minutes? (3.) The thread in the crank case in which the bolt screws for holding down one of the cylinders is stripped. How can this be remedied so that the bolt will hold in? (4.) What is the cause of excessive noise and vibration? (5.) What necessary alterations should I have to make to enable me to run on paraffin? (6.) What is the cause of the plugs sooting up quickly? Would new piston rings cure this trouble? (7.) Does the law forbid me to use a small amount of paraffin or benzolene?—A.K.

(1.) It is chiefly a matter of personal choice. Any well-known make of carburetter should give good results. (2.) This may be due to too rich a mixture, worn cams preventing the exhaust valves from lifting sufficiently, poor lubricating oil, or an insufficient quantity of the latter. (3.) This trouble may be overcome by fitting a larger bolt and retapping the union, or, if there is not room for a larger bolt, screwing a steel sleeve into the aluminium so that the original bolts may be used. (4.) The cause of the excessive noise is probably valve clatter and wear throughout, and possibly exhaust noise as well, due to inefficient silencing, while the vibration is due to imperfect balancing. (5.) Fit an efficient hot air intake, and, if possible, warm the paraffin in or before it reaches the float chamber. (6.) The plugs soot up owing to over-lubrication, riding on too strong a mixture, or to slack piston rings. New rings and a new carburetter would probably cure it. (7.) Paraffin and benzolene are counted by the Petrol Control Committee as a petrol substitute, and taxed in the same manner as petrol.

## Plug Position.

I have a 2 h.p. Humber machine with the sparking plug placed over the centre of the piston. Would you tell me (1) if it would be better placed over the inlet valve, for running on petrol, (2) or if its present position would be an advantage or otherwise when running on substitute?—LIGHTWEIGHT.

(1.) The position over the inlet valve is generally accredited to be the most satisfactory; but if the sparking plug shows no signs of becoming sooted up in its present position, we hardly think it is worth while your altering it. (2.) It does not matter whether you are running on petrol or petrol substitute, the most efficient place is undoubtedly the centre of the cylinder head.

## Difficulty in Starting.

My 1912 P. and M. has of late (even in hot weather) been difficult to start from dead cold. It will, when primed, fire at once, and always, but only for a few moments, evidently whilst the petrol in the priming lasts. I have tried every possible combination of positions of the control levers, but nothing seems to make much difference. Before I can get going I have to keep on priming and pushing off until the cylinder head warms up properly, when it will continue firing and run until stopped voluntarily. It will start quite easily when not dead cold. The following remarks will be of service to you in your diagnosis of the trouble: (1.) The cylinder head, piston, and ring grooves are quite free from carbon deposit (the engine has only just been down for cleaning). (2.) The magneto rocker arm is quite free, and the platinum points clean and flat. (3.) The clearance between the tappets and the valve stems is ample, and, I think, about correct. (4.) The petrol feed system is quite clear and clean, and the jet has never been altered. (5.) I always flood the carburetter before attempting to start. (6.) The petrol level is about correct. In conclusion, I have plenty of power, and the machine runs well when once started, firing evenly, and giving no trouble whatever.—A.H.P.

The trouble is probably due to the bad petrol on sale at the present time, or it might be due to an air leak, which may be caused by a faulty joint at the inlet pipe or induction pipe unions, or to a worn air slide in the carburetter. Try the effect of placing your hand over the air intake when starting from cold.



### Lubricating the Gear Box.

**?** I have just had my B.S.A. motor bicycle done up, and find the gear box has been filled with thick grease similar to what one sees in railway waggons. The B.S.A. people recommend this oil for the gears. Do you think the grease will do all right, or would it be better to have it out and oil put in instead?—T.P.L.

Thick grease is quite satisfactory for gear box lubrication, but gear oil is better. You might add a little engine oil to the present contents of the box; but if your machine has chain-cum-belt transmission, do not overfill the gear box, or you will be troubled by belt slip caused by oil on the belt.

### Flywheel out of Truth.

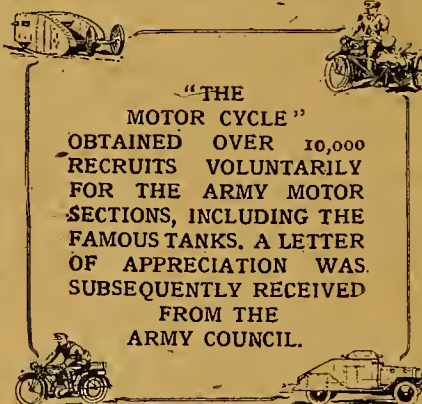
**?** I should feel grateful for your advice on the following matter. I was nine miles from home recently when my two-stroke lightweight gave out with a very loud grating noise. I examined it as best I could, and, not finding anything amiss, I tried to restart, but could not do so. The other day I took the whole engine down, and discovered that the flywheel was loose. The joint was so badly worn that I wondered how it remained on so long. The keyway in the crankshaft was also damaged. I got a new key and had the crankshaft dressed up, but I am afraid a bad job was made of it, as play was left in both the flywheel slot and keyway in the crankshaft. As a matter of fact, I do not think the flywheel was touched. Is the slot in the flywheel a tapered one, as mine is very much tapered? The repairers must have reduced the crankshaft somewhat, for the flywheel when revolved is out of truth. Would that have any effect on the running of the engine? By the way, I made a very small steel wedge the length of the key and the width of the slot in the flywheel. Kindly tell me would it hold, or could you advise any means by which I could lock the same? The flywheel is nearly  $\frac{1}{2}$  in. out of alignment.—J.C.

We do not quite see how the flywheel of your lightweight machine coming loose would cause the engine to pull up in the manner described unless the flywheel were running so far out of truth that the periphery fouled some portion of the engine or transmission. You should not have allowed any but a thoroughly qualified engineering firm to have tackled this repair. You may find that if the work has been badly done it will increase the difficulty in making a permanent repair. The key between the crank and the flywheel is not tapered, though naturally, if there were play it would wear tapered. It would certainly not be advisable to run the engine with the flywheel so far out of truth. Firstly, because the flywheel is bound to work loose again; secondly, because it would cause excessive vibration and wear; and thirdly, because it would possibly throw the crank out of truth. We would recommend you to submit the work to one of the several engineering firms which advertise in our columns that they make a speciality of engine repairs of this kind.

### Licences Required.

**?** As a reader of *The Motor Cycle* I should be much obliged if you could inform me where to get a motor licence and what I shall require. I am working in a munition factory, and have over 100 miles per week to ride on a push cycle, so am thinking of getting a motor cycle for these journeys.—A.S.

You will require: (1.) A driving licence, obtainable from the clerk of the County Council or from the Central Police Station, 5s. (2.) Inland Revenue licence, obtainable at any Post Office, £1. (3.) Registration (Central Police Station). If you buy a second-hand machine you can have the numbers transferred, which will cost you 1s.; if a new machine you will have to have it registered, which will cost you 5s. (4.) A petrol permit. The Petrol Control Committee, 19, Berkeley Street, London, W. We would advise you to draft a letter to the Committee, stating your case fully, and also stating the amount of petrol you will actually require. We would not recommend you to purchase a machine until you have obtained a petrol permit.



### Running on Paraffin.

**?** (1.) My petrol licence having run out, and as I have applied for and cannot get a new one, am I in order in using my small stock of about four gallons of petrol without a petrol licence? (2.) My motor cycle is a 1916  $2\frac{1}{2}$  h.p. single-speed two-stroke. Do you think it ought to run on paraffin; and if so, what damage might it do? (3.) I have a  $\frac{3}{4}$  in. belt, and it is always slipping. I weigh only 8 stone, and the machine will hardly pull me up a decent hill. All the covering of the belt is coming loose through it slipping. (4.) My friend sent his driving licence for renewal three weeks ago, and having received no answer, is he permitted to ride until his licence comes back?—O.P.

(1.) Yes, perfectly in order. (2.) The engine should run on paraffin, provided steps are taken to see that it is properly vaporised—by fitting a vaporiser, by taking the air in warm, and by heating up the engine first of all on petrol. You will also require more lubricating oil. Unless you follow this advice you are liable to get heavy carbon deposits and lubrication troubles. (3.) The trouble with the belt is probably due to the

pulleys being badly worn or out of alignment. (4.) He is still permitted to ride, but he should endeavour to get some sort of letter or acknowledgment from the Clerk of the Council, so that in case he is stopped he can prove to the policeman he is awaiting the return of his licence.

### Using the Compression as a Brake.

**?** (1.) Is it advisable to use the engine compression as a brake? (2.) What is the correct rate of flow for the drip-oil feed of my 1912 8 h.p. Rex-Jap? (3.) Lately my machine seems to labour greatly up hills on high gear, and I often have to change into low gear; but when I reach the top it seems to attain its usual speed. I have climbed these same hills on high gear many times before. Am I giving it too much or too little oil, or is the belt slipping?—S.A.

(1.) Yes, this is quite in order. (2.) About one drop every two seconds at twenty miles an hour. (3.) Perhaps you are giving too little oil, and possibly the engine requires to be cleaned of carbon deposit. You can easily tell if the belt is slipping by the fact that the engine revolves fast when the machine slows down.

### READER'S REPLY.

#### Firing on One Cylinder.

There was a query from "B.E.R.P." in one of your issues a month or so back [April 12th.—Ed.] as to his trouble in starting his  $2\frac{1}{2}$  h.p. W.D. Douglas. "B.E.R.P." says he has trouble with one cylinder not firing until after he has covered anything from a quarter of a mile up to two miles. I have had the same trouble with my Douglas machine. The first time it was due to the front exhaust valve, and the second time to the front tappet rod. They were gummed up with oil, and, though not immovable, the valve spring was not strong enough to return the valve to its seating quickly. The remedy is to remove the valve and clean the stem, and pull out the tappet rod to its fullest extent a few times and clean with petrol. My machine is normally a phenomenally easy starter. I never even flood the carburetter. "B.E.R.P.'s" trouble may have been the same as mine.—W. H. RICHARDS.

### RECOMMENDED ROUTES.

#### PLYMOUTH TO FALMOUTH.—D.G.S.

Plymouth, ferry to Torpoint, Antony, Polbathic, Liskeard, St. Austell, Probus, Truro, Falmouth.

#### SALFORD TO BLACKPOOL.—A.G.

Salford, Bolton, Chorley, Preston, Lytham, Blackpool. Approximately 50 miles.

#### BEARSDEN TO NORTH BERWICK.—D.R.

Bearsdan, Kirkintilloch, Kilsyth, Falkirk, Linlithgow, Winchburgh, Edinburgh, Dalkeith, Haddington, North Berwick.

#### COVENTRY TO RHYL.—S.H.

Coventry, Stonebridge, Castle Bromwich, Brownhills, Gailey, Newport, Hinckley, Whitechurch, Wrexham, Mold, St. Asaph, Rhyl.





## A Square Tread Car Cover in Miniature.

An examination of the above illustration will show that the main features of the unique principles of design and construction, which are responsible for the great success of the famous Michelin Square Tread Car Cover, are incorporated in The "Trident" Cover.

*No Increase in Prices.*

26 x 2—26/6.

26 x 2 $\frac{1}{4}$ —28/6.

26 x 2 $\frac{1}{2}$ —31/-.

# MICHELIN MOTOR CYCLE TYRES



MICHELIN TYRE CO., LTD., 81, Fulham Rd., Chelsea, London, S.W.3.



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd.**, and crossed **& Co.**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**ABINGDON** King Dick, 1914, 3 1/2 h.p., 3-speed, clutch, new coach sidcar, all accessories, perfect; £245.—Bennett, 79, Upton Lane, Forest Gate, E.7. [5614]

**3 1/2 h.p.** Abingdon, about 1913, drop frame, 2-speed, free engine, starter, splendid condition inside and out; £220.—69, Cambridge Rd., Kilburn, N.W. [X2918]

**ABINGDON**, 3 1/2 h.p., single-speed, adjustable pulley, Bosch mag., pan seat saddle; £28; E.P. or exchange.—Service Co., 292, High Holborn, London. [5883]

### A.J.S.

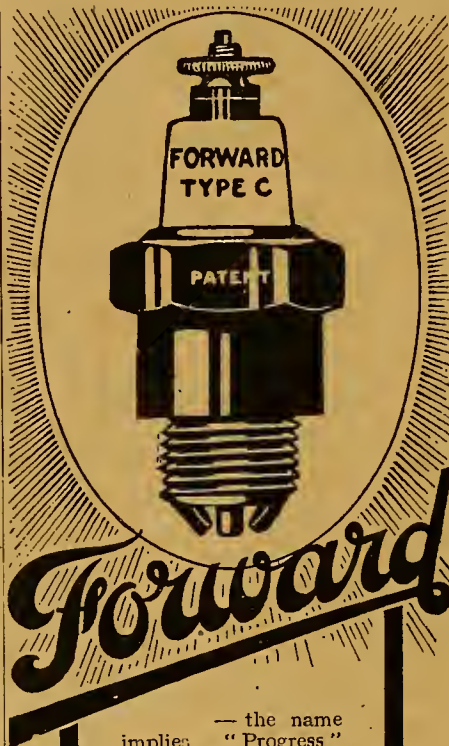
**1914** 6 h.p. A.J.S., 3 speeds, etc.; £49.—Cross, Effingham Sq., Rotherham. [X2961]

**1913** A.J.S., 6 h.p., 2 speeds, and sidcar; £32.—Tuke and Bell, Ltd., Motor Dept., Carlton Engineering Works, Tottenham, N.17. [5754]

**A.J.S.**, 6 h.p., 1914 model, 3-speed, clutch, and kick start, large business sidcar, all in excellent condition; £58.—Hopkins, New St., Leamington. [X2957]

**A.J.S.**, 2 1/2 h.p., 1914, 2-speed, clutch, perfect condition throughout, not run 3,000 miles, lamp and horn complete; 28 gns.—Preece, Burghill, Hereford. [X2937]

**2 1/2 h.p.** A.J.S., 1915, 3-speed model, hand-controlled clutch and kick start, mechanically fit, smart machine, fitted with a complete set of Lucas best accessories; £45; guaranteed.—Wauchope's, 9, Shoe Lane, London. [5790]



— the name implies "Progress" and the Plug ensures it

The dictionary tells us that progress means "improvement of any kind," and the "Forward" means improvement all the time.

And remember there are illustrated in our latest catalogue a full range of models, and that Catalogue awaits your call.

Prices from 3/6 to 5/-

**Forward Motor Co.,**  
35, Forward Works,  
Summer Row,  
**BIRMINGHAM.**



## IMPORTANT NOTICE.

Owing to the August Holidays, the issue of "The Motor Cycle" for August 9th must be closed for press earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, August 2nd.

## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**A.J.S.** Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

**A.J.S.** 6 h.p. Late 1915 Twin Combination, Lucas dynamo lighting set, 4 detachable wheels, fully and well equipped, equals new in every detail; 100 gns.—Percy and Co., 337, Euston Rd., London. [5874]

**A.J.S.**, 1915, 2 1/2 h.p., 3-speed, clutch, T.T. bars, P. and H. head lamp, generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.1. [4203]

**A.J.S.** 1916 6 h.p. Twin 3-speed Combination, screen, speedometer, and lamps, a perfect machine; price and demonstration on application.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [5685]

**6 h.p. A.J.S.**, 1916, 3-speed, clutch and kick start model, detachable wheels, fitted with handsome de luxe sidcar, complete with accessories; 100 gns.; guaranteed.—Wauchope's, 9, Shoe Lane, London. [5796]

### Alldays.

**1917** Alldays Allon, shop-soiled; £40.—Jones, Garage, Broadway, Muswell Hill. [5851]

**RIDER TROWARD and Co.**, Hampstead.—1916 Alldays Allon, 2-speed; 29 gns. [5512]

**RIDER TROWARD'S**, 78, High St., Hampstead.—1914 Alldays Matchless, 4 h.p., clutch; 19 gns. [5526]

**1916** Allon (Rolls-Royce of 2-strokes), 2 1/2 h.p., 2-speed, splendid condition; £28.—Webb, 111, Bow Rd., London, E. [5653]

**1916** Alldays Allon, 2 1/2 h.p., 2-speed, clutch, in good condition; £35, near offer.—30, Park Rd., Bearwood, Birmingham. [X2751]

**OWNER** Called Up.—Alldays Allon, 1916, 2-speed; 30 gns., no offers.—Broom, 77, Marylebone Lane, Oxford St., W. [5767]

**ALLON** 2 1/2 h.p. Model de Luxe, 2-speed, kick starter, nearly new, ridden less than 500 miles; £45 cash.—W.J.M., 32, North St., Taunton. [5622]

**ALLON**, 2 1/2 h.p., 2-stroke, 1916 model, excellent condition, Lucas lighting set, horn, and accessories; £25 cash.—V. Stevens, Prescott, Stourbridge, Worcester-shire. [5667]

**ALLDAYS** Matchless, 3 1/2 h.p., 3 speeds, counter-shaft, kick starter, chain driven, coachbuilt sidcar, in real good order; £35.—Percy and Co., 337, Euston Rd., London. [5667]

**ALLON** 2 1/2 h.p. 2-stroke Motor Cycle, £38/14, or on extended payments terms, deposit £7/14, and 12 monthly payments of £2/13; 2-speed and other models also supplied.—Harrods, Motor Cycle Dept., Brompton, Rd., London, S.W.1. [5821]



## MOTOR CYCLES FOR SALE.

## Alldays.

**COLMOORE** Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [X0796]  
**ALLDAYS** Allon, 2-speed, £35; single, £32/10; single-speed, new, £36; 2-speed, new, £42; 2-speed and hand clutch, new, £45; E.P. or exchange. Service Co., 292, High Holborn, London. [5884]

Only Added to £42 for a new Allon, 2-stroke, 2-speed model, or gradual payments of 1/4 down the remainder in 12 equal monthly payments.—Wanchope's, 9, Shoe Lane, Fleet St., London. [5791]

## Ariel.

**ARIEL**, new, 3 1/2 h.p., 3-speed countershaft model; £65.—Whitbread, Sheffield. [2892]

**ARIEL**, 3 1/2 h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562]

**COLMOORE** Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797]

3 h.p. Ariel Lightweight, mag., B. and B. splendid 4 condition; £7; called up.—Star, Rylands Row, Ligan. [X2969]

**ARIEL**, 3 1/2 h.p., free engine, in real good order and condition; £15.—Percy and Co., 337, Euston Rd., London. [5881]

17 Ariels in stock; immediate deliveries; deferred payments if desired.—Jones, Garage, Broadway, Newell Hill. [5852]

**ARIEL** Latest 1917 Combination, actually here; £24/10.—Lumb's, 151, High St., Walthamstow, and High Rd., Wood Green. [5694]

**ARIEL**, 3 1/2 h.p., and sidecar, 3 speeds, free engine, and extra single gear wheel, and all back fittings; price £33.—A. W. Hudson, Burham Westgate, Norfolk. [5661]

## Auto-Wheels.

**UTO-WHEEL**, splendid condition; £5/5, gift.—Barfield, 7, Fairfax Rd., Hampton Wick, Middlesex. [X2749]

**UTO-WHEEL**, 1914 model, perfect mechanical condition, good tyre; bargain, £7/10.—Advertiser, 156, Portland St., W. [5181]

**UTO-WHEEL**, B.S.A. make, Model de Luxe, December, 1915, in splendid condition; £12; can be bought by appointment any day after 5 p.m.—Dennant, Wall St., Balls Pond Rd., N.1. [5604]

## Bat.

8-h.p. Bat-Jap, in good condition, 2-speed twin, Bosch, this year's model fittings; £30, bargain; nearly new coachbuilt sidecar included.—2, Brett Rd., Stonebridge Park, Willesden, N.W. [5613]

## Blackburne.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1912 T.T. Blackburne; 23 gns. [5523]

## Bradbury.

13 Bradbury, clutch, handle starter, Philipson, perfect; £20.—Gerard, 10, Belmont Av., Edmonton. [5797]

**BRADBURY** and Sidecar, wicker, N.S.U. 2-speed gear; £35; E.P. or exchange.—Service Co., 292, High Holborn, London. [5885]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Bradbury, 1912-13 N.S.U. 2-speed clutch, 19 gns.; Bradbury, 1913, 3-speed, 21 gns.; no sidecar for either, 3 gns. [5518]

## Brough.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Latest 1916 T.T. Brough, Sturmey-Densmore countershaft gears; 62 gns. [5524]

## B.S.A.

**COLMOORE** Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798]

B.S.A., 1913, Semi T.T., perfect running order, fast; £25.—Red Deer Garage, South Croydon. [5721]

16 B.S.A., 3-speed, with coachbuilt sidecar; £57/10, or offer.—455, York Rd., Wandsworth. [5710]

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888]

B.S.A., 1912, perfect, 2 lamps, Klaxon horn, tools; bargain, £18.—Lyson, Lakes Av., Barrow-in-Furness. [X2907]

12 Free Engine B.S.A., new Dualpols and belt, lamp, and tools, first-class condition; £25.—Gians, Carlisle, Carlisle. [5669]

B.S.A., 3 1/2 h.p., 1912-1913, clutch model, T.T. handlebar, nearly new tyres; £25.—Engles and Co., High Acton, W.3. [X2979]

B.S.A., 1917, countershaft model, well equipped, brand new, unriden; cost £75, sacrifice £65.—McLair, East Molesey. [X3030]

15 1/2 B.S.A. Combination, like new; £60; exchange higher power Enfield, Harley preferred. 139, Cotterill Rd., Surbiton. [5740]

B.S.A. Combination, Model H, fitted wind screen, 2 lamps, horn, little used, absolutely as new; £66.—Idgley, Bethel Rd., Rotherham. [X2913]

B.S.A., 1916, chain-cum-belt, and Canoelet sidecar, tyres perfect, lamps, tools, under 1,000 miles; 63 gns., no offers.—W. Boffey, Swadlincote. [5696]

## SIDECAR OUTFITS

WANTED for Spot Cash:

ENFIELDS, A.J.S., B.S.A.'s, HARLEYS, MATCHLESS.

ALSO

Solo Triumphs, Douglasses, B.S.A.'s, Nortons, etc.,

not earlier than 1914, but 1915-6 models preferred.

## FOR SALE.

## SIDECAR OUTFITS.

CLYNO, 1914, 6 h.p., 3-speed, spare wheel ..... £65

J.H., 1915, 8 h.p., M.A.G., countershaft 3-speed ..... £78

INDIAN, 1915, 7-9 h.p., 3-speed, spring frame ..... £60

INDIAN, 1916, 7-9 h.p. Power-plus, 3-speed, spring frame.. £90

BRADBURY, 4 h.p., 2-speed, coach-built sidecar ..... £30

## SOLO MACHINES.

DOUGLAS, 1914, 2 1/2 h.p., 2-sp. £42

NEW IMPERIAL-J.A.P., 1915, 2 1/2 h.p., 2-speed ..... £30

ROYAL RUBY, 1916, 2 1/2 h.p., 2-stroke, 2-speed, new ..... £32

COVENTRY EAGLE, 1916, 2 1/2 h.p., 2-stroke, new ..... £31

REX, 1913, 4 h.p., 2-speed, handle-start ..... £22

J.E.S., 1 h.p., lightweight, mag. £9

RUDGE, 3 1/2 h.p., clutch model, as new ..... £33

SCOTT, 1914, 3 1/2 h.p., all accessories ..... £55

CALTHORPE, 1915, 2 1/2 h.p., 2-speed ..... £25

BAT-J.A.P., 5-6 h.p., special speed model ..... £22

RUDGE, 1913, 3 1/2 h.p. Multi, excellent order ..... £28

LUGTON, 1915, 3 1/2 h.p. Precision engine, like new ..... £25

RUDGE, 1912, 3 1/2 h.p., very fast, excellent condition ... £22

DAYTON, 1 1/2 h.p., magneto, excellent lightweight ..... £14

IVY, 2 1/2 h.p. Twin, overhead valves, 3 speeds ..... £19

ARIEL, 2 1/2 h.p., 3-speed, splendid solo mount ..... £22

**SPECIAL.—We have a few machines to clear at very reduced prices, requiring overhaul. Full particulars upon request.**

Comprehensive Stock of NEW MODELS, including:

B.S.A., ALLON, CALTHORPE, ENFIELD, ROYAL RUBY, JAMES.

## MAUDES' MOTOR MART,

100, Gt. Portland St., London, W.1.

'Phone: 552 Mayfair.

Grams: "Abdicate, Wesdo, London."

## MOTOR CYCLES FOR SALE.

## B.S.A.

1916 B.S.A. Combination, 4 1/2 h.p., condition equal new; lowest cash £58; P.H. lamps, spares.—F. Abery, Uley, Hatton St., Wellingborough. [5743]

1917 B.S.A. in stock Catalogues free. Spare parts per return. 1 in. belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529]

B.S.A., 4 1/2 h.p., brand new, in stock, £62; B.S.A., 4 1/2 h.p., late 1915, indistinguishable from new, coach-built sidecar; £60.—Perry and Co., 337, Euston Rd., London. [5871]

B.S.A., late 1913, 2 speeds, new tyres, condition like new, £38; sidecar for same, £8; no reasonable offer refused.—Broom, 77, Marylebone Lane, Oxford St., W. [5766]

1916 B.S.A., perfect condition, 3-speed, 4 1/2 h.p.; price 48 gns.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealer in the South. 'Phone: 1024. [0911]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—B.S.A., 1916, 4 1/2 h.p., all chain drive, 3-speed, as new, 54 gns.; 1913 T.T. 2-speed B.S.A., 29 gns. [5519]

**GENUINE** 1915 B.S.A., countershaft 3-speed, clutch, kick starter, excellent condition throughout, and completely equipped; bargain, £45.—Newham, 223, Hammersmith Rd., W.6. 'Phone: 80. [5838]

4 1/2 h.p. B.S.A., all chain drive, and Godiva coachbuilt sidecar, upholstered in Bedford cord, Lucas dynamo lighting, a most luxurious combination; £80.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0552]

1916 B.S.A., chain-belt, 3-speed countershaft gear, 4 1/2 h.p., suitable for sidecar work; price only 46 gns.; undoubtedly the cheapest B.S.A. in England to-day.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealer in the South. 'Phone: 1024. [0916]

1917 Model K B.S.A., brand new 3 weeks ago, done not more than 50 miles, complete with 'I' and H. head, Lucas rear lamps (never used), Klaxon horn, a real bargain; T.T. or touring bars, £62; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill. [5853]

4 1/2 h.p. 1916 B.S.A., all-chain drive model, 3-speed countershaft gear, kick starter, with accessories, 50 gns., if fitted with new Canoelet sidecar £17/10 extra; also 3 1/2 h.p. B.S.A., 2-speed model, complete with accessories, £21/10; guaranteed.—Wanchope's, 9, Shoe Lane, Fleet St., London. [5787]

## Calthorpe.

**COLMOORE** Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

**CALTHORPE-J.A.P.**, 2 1/2 h.p., 1915, Enfield countershaft 2-speed gear; £26/10.—Motor Exchange, Horton St., Halifax. [5671]

**CALTHORPE** Motor Cycles.—All models in stock for immediate delivery.—P. J. Evans, 87-91, John Bright St., Birmingham. [X2985]

**CALTHORPE** 2-stroke, 1915, 2-speed, condition perfect; 20 gns.—Parkes, 11, Clanciarde Gardens, Notting Hill Gate, W.2. [X2910]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1915 Calthorpe-Jap, Enfield 2-speed gear, and clutch, perfect; 25 gns. [5525]

**CALTHORPE-J.A.P.**, 2 1/2 h.p., Enfield 2-speed, Spray carburettor; £29/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [5886]

**CALTHORPE-J.A.P.**, 2 1/2 h.p., 1915, 2-speed, and clutch, trip speedometer, Lucas lamps, fitted with extra tank; £25, or nearest.—Squire, 21, High St., Colchester. [5745]

1915 Calthorpe-Jap, 2 1/2 h.p., Enfield 2-speed, new tyres, T.T. handle-bar, splendid condition, spare belt; seen by appointment; £20.—Montpellier House, 115, Brecon Rd., N.19. [5660]

## Chater-Lea.

**CHATER-LEA** No. 7 Combination; £40.—70, St. James's Rd., N.7. [5633]

## Chater-Lea-Jap.

**RIDER TROWARD'S**, 31 and 78, High St., Hampstead.—1912 Chater-Lea-Jap, 8 h.p., 3-speed countershaft, underslung coach sidecar; 32 gns. [5527]

## Clyno.

**CLYNO** 1915 6 h.p. Coach Combination, detachable and spare wheels; £72/10.—Motor Exchange, Horton St., Halifax. [5670]

**CLYNO** 6 h.p. Combination, 2-speed; bargain, £30, or exchange for single-cyl. combination.—Snook, Crows Nest, Markfield Rd., Tottenham. [5641]

**CLYNO**, late 1914, 2 1/2 h.p., 2-speed, clutch, Miller lamps, tools, running perfectly; £22.—Goodwin, R.E., Sandown Park, Esher, Surrey. [X3032]

**CLYNO** War Office Combinations for immediate delivery from Colmore Depot, Birmingham and Manchester; inclusive price with spare wheel, 100 gns. [0884]

**CLYNO**, 1914-15, 6 h.p. engine, kick-starter, 3-speed, coachbuilt sidecar, a very powerful combination; £65; E.P. or exchange.—Service Co., 292, High Holborn, London. [5887]



## MOTOR CYCLES FOR SALE.

## Clyno.

CLYNO, 1914, 2-stroke, 2 speeds, new tyres; £22.—Rover Depot, 19, Holborn Viaduct, E.C. [5703]

## Connaught.

1915 Connaught, 2-stroke, complete with lamps and accessories; £17/10.—Newall, 84, Hamilton St., Ashton-under-Lyne. [X2888]

CONNAUGHT, 2½ h.p., 1915, 2-stroke, T.T. handlebar, variable ignition, all accessories; £20.—Eagles and Co., High St., Acton, W.3. [X2982]

CONNAUGHT Miniature, single speed, £28/17/6; standard 2-speed, £45/2; new; E.P. no extra, or exchange.—Service Co., 292, High Holborn, London. [5572]

CONNAUGHT, 2½ h.p., 1916, 2-speed, a thoroughly reliable 2-stroke, £29/10; miniature, single-speed, new, £28/17/6; standard, 2-speed, new, £45/2; E.P. or exchange.—Service Co., 292, High Holborn, London. [5888]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new, 42 gns.; E.P. no extra, or exchange.—Service Co., 292, High Holborn, London. [5889]

COVENTRY Eagles, strongly built, reliable, and attractive machines, fitted with Villiers 2½ h.p. 2-stroke engine, Brampton forks, pun saddle, 2 footbags; £37; extended payment terms, deposit £7/8, and 12 monthly payments of £2/10/7.—Harrods, New Motor Showrooms, 118, Brompton Rd., London, S.W.1. [5816]

## Douglas.

DOUGLAS, 1915, 4 h.p., 2 speeds, almost new; £55.

DOUGLAS, 1915, 2½ h.p., 2 speeds, almost new; £42.

DOUGLAS, 1913, 2½ h.p., 2 speeds, almost new; £30.—Percy and Co., 337, Euston Rd., London. [5864]

1915 W.D. 2-speed Douglas, Dualops, fine order; £40.—Wilderspin, Chatteris. [5751]

DOUGLAS, 1911, 2-speed; £23.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [5279]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, 2½ h.p., little used, joined Flying Corps; £32/10.—100, High Rd., New Southgate. [5798]

2½ h.p. Douglas, reliable machine; £12.—Newnam, 24, 223, Hammersmith Rd., W.6. Phone: 80. [5841]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 T.T. Douglas, 2-speed, perfect; 34 gns. [5520]

2½ h.p. 1912 Douglas, £23/10; also a T.T. 2½ h.p. 1913 model, £32/10.—Wauchope's, 9, Shoe Lane, E.C. [5789]

1911 Douglas, good condition, runs on paraffin, lamps, spares; £14; appointment.—Ewen, 18, Cleveland Av., Chiswick. [X2928]

DOUGLAS: prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800]

DOUGLAS, 1912, 2½ h.p., 2-speed, T.T. bars, with spares, good condition; £25.—R. V. Sellers, the motor cycle specialist, Dorchester. [5713]

DOUGLAS, 1913, 2-speed, clutch, and kick start, all accessories, excellent condition; 30 gns., or offers.—155, Seven Sisters Rd., Holloway, N.7. [5707]

DOUGLAS, 1914, 2½ h.p. T.T., speedometer, lamps, accessories, Morgan vapouriser, beautiful condition; £38/10.—R. V. Sellers, the motor cycle specialist, Dorchester. [5714]

DOUGLAS, 1913, T.T., single-speed, late model, perfect; cheap, £16/10. Wanted, Douglas flywheel.—Jennings, 41, Reed-pond Walk, Gidea Park, Romford. [5776]

DOUGLAS T.T. Model, 2½ h.p., 1914 model W.D., Amac carburettor, Bosch mag., just overhauled; price £32.—Hall's Garage, Ltd., Motor Agents, Stevenage, Herts. [5648]

LATE 1915 2½ h.p. Douglas, 3-speed, clutch, kick start, Jones 2,680, spare tank, lamp, etc., tip-top order; £45, or nearest offer.—48, George St., Chester-ton Rd., Cambridge. [X3002]

1915 2½ h.p. Model U Douglas, 3-speed, footboards, C.A.V. mag., upturned or semi-T.T. bars, Dualops, good condition; £42/10.—Robinson's Garage, Green St., Cambridge. [5781]

1913 Douglas, 2-speed, in fine condition, £32; 1914 Douglas, 2-speed, with 1916 Amac, and 1912 engine, in good running order, £28; seen by appointment.—Loughurst, Sunningbank, Ewell. [5607]

2½ h.p. Douglas, absolutely new; immediate delivery of models U, V, W, clutch, kick start, against priority permits, for doctors, farmers, war and munition workers, etc. How and where to apply.—For full particulars write to the Douglas Specialists, Robinson's Garage, Green St., Cambridge. Tel.: 368. T.A.; Bicycles. [5782]

# LAMB'S

## Attractive

### MOTOR CYCLE

# BARGAINS

for 1917

## NEW MACHINES HERE IN STOCK.

ARIEL 1917 kick-starter Combination .. £93 10

HARLEY-DAVIDSON, slightly soiled, 1917,

2-g h.p., 17F, and Swan sporting

Sidcar, disc wheel .....

LEVIS, Model E, 2-speed .....

LEVIS, Popular model .....

CALTHORPE-J.A.P., 2-speed .....

CALTHORPE 1917, 2½ h.p., 2-speed,

and Watsonian sidcar .....

ROYAL RUBY, 2-speed, J.A.P. ....

ROYAL RUBY, 2-speed, 2-stroke ....

ALLDAYS ALLON, single-speed .....

ALLDAYS ALLON, 2-speed .....

ALLDAYS ALLON, 2-speed, clutch .....

ENFIELD, 1917, 2-sp., 2½ h.p., 2-stroke ..

ENFIELD 1917 Tradesman's Outfit, just

arrived .....

ROVER, latest 1917, 3½ h.p., 3-speed Com-

ination .....

JAMES, latest 1917, No. 6, 4½ h.p., 3-speed

Combination .....

JAMES 1917 3½ h.p. twin .....

SECOND-HANDS.

PREMIER, 1914, 2-sp., countershaft gear,

and 2-seater folding Sidcar; has not

been used for 2½ years .....

A.J.S., 1916, 3-speed, 6 h.p. Combination,

with screen .....

ENFIELD 1916 Combination, 6 h.p., dyn.

lighting .....

ENFIELD, 1917, 3 h.p., 2-speed, Watsonian

Combination, speedometer, lamps and

horn .....

ENFIELD, 1913-4, 6 h.p., Combination,

condition like 1917 machine .....

ENFIELD 1916 Standard Model, perfect

condition .....

ENFIELD 1916 box carrier, complete ..

DOUGLAS, 1912, 2-speed, F.E., k/starter

TRIUMPH, 1913, 3-sp., p-start, and new

1½ Phoenix Sidcar .....

ZENITH, 1915, 4-5 h.p., twin, counter-

shaft Combination .....

ALLDAYS ALLON, 1917, 2-speed, clutch

model; ridden 6 times only .....

ALLDAYS ALLON, 1915, single-speed,

recently overhauled by makers .....

MATCHLESS, 1913, 2-speed Combination

N.B.—CLOSED FOR HOLIDAYS—From Monday,

August 6th, until Friday, August 10th.

WANTED.—MECHANICS; one used to Cycle

and Motor Cycle Repairs, quick worker, good

opportunity for right man. First hand, 1/- per

hour; Second hand, 9d. per hour.

WANTED.—Progressive Position offered to

JUNIOR SALESMAN or SALES MANAGER for

Cycle and Motor Department. Only those having

held previous positions need apply.

Subject to Government conditions.

# LAMB'S,

151, HIGH ST.,  
WALTHAMSTOW,  
N.E.  
Phone: Walthamstow 163.  
(6 minutes Hoe St. (Q.E.R.).

Also at 50, HIGH RD.,  
WOOD GREEN, N.  
Only depot in this district.  
Phone: Hornsey 1956.  
Hours—9 to 8.  
Thursdays, 1 o'clock.

## MOTOR CYCLES FOR SALE.

## Douglas.

DOUGLAS, 1915, Colonial model, £47/10; 1911, fitted with lamps and tools, £16; 1913, 2-speed, Bosch mag., Amac carburettor, £32; E.P. or exchange.—Service Co., 292, High Holborn, London. [5890]

DOUGLAS, 2½ h.p., 2-speed, C.A.V. electrically equipped, Cowey speedometer, Smith watch, electric and bulb horns, spares, tools, perfect condition; fast; genuine bargain, £32/10, no offers.—Long, 23, Thomas St., Woolwich, S.E. [X2955]

1915 Douglas, 2½ h.p., 2-speed, with semi T.T. bars, fitted with Lucas lamp, Watford speedometer, in absolutely perfect condition; only 43 gns.; very great bargain.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealer in the South. Phone: 1024. [0917]

DOUGLAS S. COX'S Bargains.—1915 Chatter-Len lightweight, 2-speed countershaft, 2-stroke, splendid order, £23/10; 1913 6 h.p. Matchless combination, 3-speed, handle starter, £36/10; also 50 cars.—Please call, Douglas S. Cox, 6c, Lansdowne Hill, West Norwood, S.E.27. [5860]

4 h.p. Douglas, latest model, complete with luxurious coachbuilt sidcar, Lucas dynamo lighting set, electric horn, speedometer, complete set tools and spares, ridden only 2,225 miles, condition as new throughout.—F. Harris, 8, Bambergh Gardens, Goldhawk Rd., Shepherd's Bush, W. Phone: Hammersmith 267. [5595]

## Edmund.

YOU Simply Float on an Edmund.—Gorlay, The Great Douglas Agent, Fallowfield, Manchester. [5812]

EDMUNDS, 2½ h.p. J.A.P., special spring frame, Royal Enfield 2-speed gear, double tank; £50/8; extended payments arranged.—Harrods, New Motor Showrooms, 118, Brompton Rd., London, S.W.1. [5823]

## Elswick.

ELSWICK, 2-stroke, 2½ h.p., 1915, tools, horn; bargain, £14.—Dyson, Lukes Av., Barrow-in-Furness. [X2906]

## Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3 h.p. Twin; £57/10; and 2½ h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycles Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838]

1915 3 h.p. Enfield, lamps, speedometer, tools; £35.—Corfield, 2c, Park Rd., Redditch. [X2871]

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801]

ENFIELD Combination, 1916, hood, screen, speedometer, etc., in good order; £87/10.—Motor Exchange, Horton St., Halifax. [5672]

ENFIELD Combination, 1916, fitted with all accessories, guaranteed date and condition; £70.—51, Maplethorpe Rd., Thornton Heath, S.E. [5728]

ENFIELD, late 1912, 2½ h.p., 2-speed, in perfect order and splendid condition; £22, or nearest.—313, Kingston Rd., Wimbledon, Surrey. [5636]

ENFIELD Motor Cycles; immediate delivery all models, with permit or Class A certificate.—P. J. Evans, 87-91, John Bright St., Birmingham. [X2966]

ENFIELD Combination, 6 h.p., 1914, condition almost as new; great bargain, £45.—Sgt.-Major Swan, 30, Eltham Rd., Lee, S.E. Phone: 76 Lee Green. [X2944]

LATE 1914 Enfield Combination, body just painted, spare set new Renold chains, everything perfect. 3in. tyres; £58.—Taylor, 7, Craigmere Rd., Blackheath, S.E. [5629]

ROYAL Enfield, 1916-17, 2-speed, 3 h.p., kick-starter, as new, £49/15; 2½ h.p. twin, 2-speed, £25; E.P. or exchange.—Service Co., 292, High Holborn, London. [5891]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Enfield combination, late 1916, as new, 84 gns.; 1915 3 h.p. twin, 32 gns.; 1916 2-speed, 2-stroke, 29 gns. [5521]

ENFIELD 6 h.p. Combination, 1912, splendid condition, with cane sidcar, 3 lamps and generator, tools, and spares; owner joining H.M. Forces; £40.—65, Chestergate, Macclesfield. [X2975]

1916 Enfield Combination, condition as new, fitted all round with 700x80 Palmer cord car tyres, air tube driving wheel, Stewart horn, engine and mag completely shielded; £75.—152, North Rd., St. Helens. [5685]

ENFIELD 6 h.p. Combination, handsome coachbuilt sidcar, speedometer, and all the best accessories; very powerful twin-cyl. engine, with tools to complete 70 gns.; also another combination, same make, 6 h.p. twin, and sidcar, 60 gns.; both machines guaranteed mechanically fit, and smart appearance.—Wauchope's, 9, Shoe Lane, London. [5792]

ENFIELD Brand New 1917 Tradesman's Combination, just arrived; also new 1917 2½ h.p. 2-speed, £44/2; also 1917 3 h.p. 2-speed Enfield, with Watsonian sidcar, many valuable spares, £68/10; also 1916 dynamo lighting Enfield, and fully equipped; also 1913 6 h.p. combination, condition like 1917, £55; also 1916 Standard Model, with hood and screen, £27/10, actually on the premises.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [5694]



## MOTOR CYCLES FOR SALE.

## Excelsior.

EXCELSIOR, 4½ h.p., 3 speeds, 1915; £25.—T. Tyler, Preston, Uppingham. [5602]

h.p. Excelsior Motor Cycle; £2/10.—2, Antrim Mansions, Antrim Rd., Hampstead. (Evenings.) [5596]

1914-15 Excelsior, 2½ h.p., 2-stroke, countershaft 2-speed, clutch, all chain drive, fully equipped, splendid order; £22.—4, Hare St., Bethnal Green, E. [5835]

EXCELSIORS.—All models in stock; magneto model £75, electric lighting model £85; get a big X. You'll be satisfied.—Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester. [X1462]

AMERICAN Excelsior, 1916, 7-9 h.p., 3-speed, speedometer, mechanical horn, many spares, with coachbuilt sidecar, perfect; 65 gns.—R. V. Sellers, the motor cycle specialist, Dorchester. [5712]

ATEST 1916 8 h.p. American Excelsior Combination, splendid condition, electric equipment, speedometer, only done 2,800; cost £105; too powerful; offers, or exchange.—Lord, Mountfield, Prestwich. [X5000]

EXCELSIOR (American) Combination, 1915 model, 7-9 h.p., 3-speed, dynamo lighting set; this machine has only been run 800 miles, and is in absolutely perfect condition throughout; £65.—Longman Bros., 1, King St., Acton, W. [5847]

## F.N.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1913 F.N. 2½ h.p., 2-speed, clutch; 5 gns. [5522]

## Forward.

FORWARD, 2½ h.p. twin; £22.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [5280]

## Harley-Davidson.

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—1915 Harley-Davidson standard combination; 65 gns. [5528]

1915 Harley-Davidson, electric model, 1916 switch, Phoenix special body sidecar; £68.—2, Belthia Villas, Barnsbury, N.1. [5772]

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models Harley-Davidsons, and spare parts. [0802]

1916 7-9 h.p. Harley-Davidson Combination, lamps, horn, in splendid condition; £89.—Elice and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0551]

1914 Harley-Davidson, 7-9 h.p., 2-speed, Mills-Fulford sidecar, screen, and apron, in excellent running order, nearly new tyres; £48.—Fairview, Queen St., Hitchin. [5634]

HARLEY-DAVIDSON, 1915 model, bought new in July, 1916, Canelet sidecar, dynamo lighting, had very little use, like new throughout; £72, or close offer. O. Nicholls, Penwithick, St. Austell. [5807]

HARLEY-DAVIDSON, 1917 model, slightly soiled, with brand new Swan sporting sidecar, £120; also expectation of 1916 dynamo set and 1915 15F model during the week. 'Phone particulars for further information.—Lamb's, 151, High St., Walthamstow, and 10, High Rd., Wood Green. [5693]

HARLEY-DAVIDSON Combination, 1915, bought new 1916, 3-speed, hand and foot clutch, D.A. lighting outfit, speedometer, Pillion seat, etc., mileage 600, like new; cost £126, sacrifice £70; take 1915 or 1916 Douglas in part exchange.—King, Chemist, Sutton, Surrey. 'Phone: 646. [5708]

## Hobart.

HOBART, 1913, good running order; £12.—Red Deer Garage, South Croydon. [5720]

## Humber.

HUMBER, 1911, 2-speed, and sidecar; £26.—65a, Rosendale Rd., Dulwich. [5700]

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

1911 3½ h.p. 2-speed Humber, perfect order, good tyres and belt; £18.—Wilderspin, Chatteris. [5753]

1914 3½ h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Gargers), Ltd., Swansea. [0863]

1912 3½ h.p. 2-speed Humber, spring forks, good tyres; £24.—Motor Exchange, Horton St., Hali-fax. [5673]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1913 Humber, 2-speed, clutch, perfect; 25 gns. [5529]

1913 Humber, 3½ h.p., Sturmer 3-speed, Lucas lamps, speedometer, horn, 4 gallons petrol, £25; wicker sidecar 30/—4, Thornton St., Kempston, Bedford. [5585]

BARGAIN.—2 h.p. Humber, thoroughly overhauled, new bushes, piston, tubes, outer cover, excellent running order, lamps, stand, carrier, etc.; £16; about 913.—80, Bispham Rd., Southport. [X2566]

## Indian.

INDIAN, 7-9 h.p., 1915; £65.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [5282]

1914 Indian and Sidecar, electric horn and head lamp, unused last 16 months, mileage only 3,500, new condition, fully equipped; £48; appointment.—28, Aitcham Rd., Tooting Broadway. [5706]

## UNOBTAINABLE!

We always have a few Machines in Stock that are not to be had for love or money elsewhere. We will let you have them for money, however, and, at present, call your attention to the following rarities:

Countershaft TRIUMPH Combination.

INDIAN Two-stroke.

F.N., 7-9 h.p., 4-cylinder, 3-speed.

BROUGH, 1916, 3-speed Countershaft.

These Machines may not be in stock when you call, as this advertisement goes in a week in advance; but, if these are sold, we shall have others equally good.

## SELECTION FROM 150 IN STOCK:

## NEW 1917 MODELS.

COVENTRY-EAGLE, 2-speed, 2-stroke .. 21 gns.  
JAMES, 2-speed, 2-stroke .. 21 gns.  
JAMES, 4½ h.p., big twin, 3-speed .. 26 gns.  
JAMES, 3½ h.p. twin, 3-speed .. 26 gns.  
GRANDEX-PRECISION, 4 h.p., T.T., single-speed .. 26 gns.  
ROVER, T.T., Philipson .. 24 gns.  
ROVER, 3-speed, countershaft .. 26 gns.

## SECOND-HAND, Under 30 gns.

TRIUMPH, 1912, 2-speed, clutch .. 18 gns.  
IVY, 1915, single-speed .. 21 gns.  
RADCO, 1917, as new .. 26 gns.  
NEW IMPERIAL, 1916, 2-speed, as new .. 26 gns.  
RUDGE, 1913, T.T., Philipson .. 24 gns.  
IVY, 1915, 2-speed, 2-stroke .. 24 gns.  
HOBART, 1916, 2-speed, 2-stroke .. 25 gns.  
LEVIS, 1917, as new .. 26 gns.  
MATCHLESS-J.A.P., 1913, T.T., 8 h.p., o.h.v. .. 27 gns.  
NEW IMPERIAL, 1916, 2-speed, as new .. 27 gns.  
DOUGLAS, 1913, T.T., 2-speed .. 29 gns.  
ENFIELD, 1916, 2-speed, 2-stroke, clutch .. 29 gns.  
REGAL-GREEN, 1915, 4 h.p., T.T., water-cooled .. 29 gns.  
RUDGE-MULTI, 1913, Standard .. 25 gns.  
ZENITH-GRADUA, 1913, 3½ h.p., perfect .. 27 gns.  
ZENITH-GRADUA, 1912, 6 h.p., perfect .. 26 gns.  
B.S.A., 1913, T.T., 2-sp., clutch .. 28 gns.

## SECOND-HAND, Under 50 gns.

RUDGE-MULTI, 1914, T.T. model .. 32 gns.  
ENFIELD, 1915, T.T., 3 h.p., 2-speed .. 32 gns.  
NORTON, 1914, T.T., Philipson .. 32 gns.  
TRIUMPH, 1914, 4 h.p., 3-speed .. 39 gns.  
MARTIN-J.A.P., 1913, 8 h.p., o.h.v. .. 39 gns.  
DOUGLAS, 1914, T.T., 2-speed .. 34 gns.  
PREMIER, 1914, 3-speed, clutch, kick-start, coach Sidecar .. 39 gns.  
INDIAN, 1915, T.T., 7-9 h.p., clutch .. 42 gns.  
INDIAN, 1915, 7-9 h.p., 3-sp., elec. light .. 49 gns.  
Machines Over 50 gns. in Value.  
B.S.A., 1916, 3-speed, unscratched .. 54 gns.  
ZENITH-GRADUA, 1915, 8 h.p., clutch, kick-start, countershaft, underslung coach Sidecar .. 57 gns.  
F.N., 7-9 h.p., 3-speed, clutch, kick-start .. 58 gns.  
HARLEY-DAVIDSON, 1915, 7-9 h.p., 3-sp., coach Sidecar .. 65 gns.  
HARLEY-DAVIDSON, 1915, 7-9 h.p., 3-sp., coach Sidecar, with dynamo .. 68 gns.  
HARLEY-DAVIDSON, 1916, 7-9 h.p., 3-sp., coach Sidecar, magneto ignition .. 82 gns.  
HARLEY-DAVIDSON, 1916, 7-9 h.p., 3-sp., coach Sidecar, dynamo lighting .. 86 gns.  
INDIAN, 1915, 7-9 h.p., 3-sp., coach S-car .. 69 gns.  
ENFIELD 1916 standard Combination, as new .. 82 gns.  
ENFIELD 1917 standard Combination, unscratched .. 86 gns.  
TRIUMPH 1917 countershaft Combination .. 86 gns.  
BOUNDS-J.A.P., 1914, 8 h.p., 3-sp., countershaft, coach Sidecar, specially tuned machine; winner of 22 First Prizes in 1914, unused since .. 69 gns.

## LIGHT CARS.

ARMSTRONG - WHITWORTH, latest model, dynamo lighting, as new .. 188 gns.  
BELSIZIE, 1913, 10-12 h.p., 4-seater, Rudge-Whitworth wire wheels, spare .. 139 gns.  
BAYARD, 1914, 9 h.p., 4-cylinder, perfect .. 159 gns.  
CALTHORPE-MINOR, 1914, elec. lighting, overhauled .. 149 gns.  
G.W.K., 1914, repainted, as new .. 129 gns.  
MORRIS-OXFORD, 1913, repainted, overhauled .. 119 gns.  
WOLSELEY, late model, sporting 12-16 h.p., 2-seater, disc wheels, perfect .. 169 gns.

## EXCHANGES.

## RIDER TROWARD &amp; Co.,

31 & 78, High St., HAMPSTEAD.

'Phone: 5392. Open 8 p.m. and Sundays.

## MOTOR CYCLES FOR SALE.

## Indian.

INDIAN, 7-9 h.p., 2-speed, with Montgomery sidecar, splendid condition; £39.—31, Trafalgar Rd., Wigan. [X2927]

INDIAN, 1914, 7-9 h.p., 2-speeds, spring frame, electric model, perfect; £38.—118, Brook St., Fifth, Kent. [5626]

2-STROKE Indian, 1916, 3-speed, clutch, kick-start, 250 c.c., perfect; 35 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. [5511]

INDIAN, 1915, 7-9 h.p., in nice condition, £42; Indian, 1915, 5 h.p., equals new, 3 speeds, £45.—Percy and Co., 337, Euston Rd., London. [5865]

INDIAN, 1913, 7-9 h.p., 2 speeds, clutch, spring frame, with Montgomery sidecar, £40; will separate, £29 and £11.—Lockett, Church St., Warrington. [X2978]

INDIAN, 7-9 h.p., clutch model, 4-point attachment, underslung Mills-Fulford sidecar, 3 lamps, horn, etc.; £45.—10, Norwood Crescent, Southport. [X2564]

1914 Indian Combination, 7-9 h.p., 2-speed, spring frame, electric lighting, horn, new tyres; £58; petrol given.—Smith, Five Houses, Newbold-on-Avon, Rugby. [X2757]

INDIAN, 5 h.p., 3-speed, kick starter, coach combination, and accessories, £69/10; also 1915 T.T. clutch model Indian, with disc wheel, tip-top lot, £55.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [5688]

INDIAN Combination, 1914, 7-9 h.p., in magnificent condition, electrically equipped, mechanically perfect, tyres excellent, enamelling and plating unscratched, speedometer, and full kit of tools; £48.—Longman Bros., 1, King St., Acton, W. [5846]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 Indian, 7-9 h.p., 3-speed, 20 g. sidecar, mileage 2,000, 68 gns.; 1915 Indian, 7-9 h.p., 3-speed, clutch, kick-start, electric lighting, 49 gns.; 1914 Indian, 7-9 h.p., 2-speed, clutch, coachbuilt sidecar, electric lighting, 52 gns.; 1915 T.T. clutch 7-9 h.p. Indian, 42 gns.; 1916 Indian, 2-stroke, 3-speed, 35 gns.; 1913 Indian, 7-9 h.p., 2-speed, clutch, 29 gns.; 1911 5 h.p. twin Indian, 16 gns. [5510]

## Ivy.

RIDER TROWARD'S, 78, High St., Hampstead.—1915 Ivy, 2-speed, 2-stroke, perfect; 24 gns. [5530]

IVY, 2-stroke, 2½ h.p., 1915, good tyres, fully equipped, as new throughout; £23.—Advertiser, 156, Gt. Portland St., W.1. [3924]

IVY, 1916, 2½ h.p., 2-stroke, 2-speed, Dunlop covers, accessories, condition as new, mileage not over 600 miles; £25.—Arney, Townsend, Fordingbridge. [5777]

## James.

3½ h.p. 1914 Twin James, 3-speed, kick start; offers.—Beauchamp, Parbury, Frome. [X2756]

1917 James, 2-stroke, done 200 miles only, complete; £38.—Cross, Agent, Rotherham. [X2958]

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803]

JAMES, 3½ h.p., 1913, 3-speed gear, nearly new tyres, all accessories; £24/10.—Egles and Co., High St., Acton, W.3. [X2983]

1915 James, 3½ h.p., T.T. twin, 3-speed, kick starter chain drive, perfect throughout; £35.—Rosenberg 17, Cambridge Rd., Mile End, E. [5836]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—New 1917 James models in stock for immediate delivery; 4½ h.p. big single, 3½ h.p. twin. [5531]

JAMES Combination, 1915, 4½ h.p., 3-speed, kick-start, splendid condition; £65; E.P. or exchange.—Service Co., 292, High Holborn, London. [5892]

JAMES, 4½ h.p., solo, purchased new December, 1916, run 1,000 miles, practically new condition, 3-speed, clutch, kick starter; £55.—Mack, 11, Esplanade, Lowestoft. [5606]

WE Can Give Immediate Delivery from stock of the 1917 3½ h.p. James twin; price £69/10.—Elice and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0491]

JAMES Latest 1917 No. 6 Combination, £87/2; also latest 1917 3½ h.p. twin, 3-speed, kick start, solo model, £69/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [5692]

3½ h.p. Twin James, 1916, 3 speeds, kick start, hand clutch, only done 1,000 miles. Blanks, tuned to 150 m.p.g., electric lighting and other refinements, considerably better than new; £58.—Desoutter, 4, Hanover St., Regent St., W.1. [5830]

4 h.p. 1915 or 1916 Big Single James Combination, 42 all chain drive, 3-speed gear, clutch, and kick starter fitted with storm apron, mica screen, beautifully upholstered, all the best accessories, and tools included; 65 gns.—Wauchope's, 9, Shoe Lane, London. [5788]

## J.A.P.

6 h.p. J.A.P. (Rex-Jap), complete with coachbuilt sidecar, 2-speed gear, spring seat, in splendid condition; £60.—Turpins, 29, Preston Rd., Brighton. [5500]

## J.E.S.

J.E.S., 1½ h.p., nearly new magneto and back cover; cheap, £9.—40, Newport Rd., Stafford. [X2943]



## MOTOR CYCLES FOR SALE.

J.H.

J.H., 2-speed, new; 34 gns.; E.P. no extra, or exchange.—Service Co., 292, High Holborn, London. [5893]

Kynoch.

KYNOCH-J.A.P., 4h.p., 1913, good condition; £19.—Whitbread, Sheffield. [X2890]

Levis.

LEVIS, 2 speeds, in real good condition; £26.—Percy and Co., 337, Euston Rd., London. [5862]

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804]

24 h.p. Levis 1915 Coachbuilt Combination, good condition; any trial; £33.—23, Equity Rd., Leicester. [5738]

LEVIS 2-stroke, 1915 Popular, a thorough good machine, £18.—Hall's Garage, Ltd., Motor Agents, Stevenage, Herts. [5650]

LEVIS, 2½ h.p., 2-stroke, good tyres, perfect condition, T.T. bars fully equipped; £24.—Advertiser, 156, Gt. Portland St., W.1. [5495]

Matchless.

MATCHLESS Motor Cycles; no quicker delivery or, reliable than from Colmore Depots. [0881]

MATCHLESS, 5h.p. twin J.A.P., free engine, in nice order and condition; £26.—Percy and Co., 337, Euston Rd., London. [5860]

MATCHLESS, 1917, war model, 8h.p. J.A.P. engine, 3-speed, with sidecar; E.P. or exchange.—Service Co., 292, High Holborn, London. [5894]

MATCHLESS Combination, 1913, just overhauled, lamps, speedometer, etc.; £50; by appointment.—Bailey, 48a, Philbeach Gardens, London, S.W.5. [5592]

MATCHLESS Combination, 8-12h.p. J.A.P., 2-speed, lately overhauled; absolute bargain, £60; owner joining up; seen by appointment.—81, High Rd., South Tottenham. [5663]

RIDER TROWARD'S, 78, High St., Hampstead.—1915 M.A.G. Matchless coach combination, child's seat, splendid trimout, 69 gns.; 1913 T.T. o.h.v. 6h.p. Matchless, 25 gns. [5532]

MATCHLESS 8h.p. (1913), and sidecar, J.A.P., 2-speed, kick starter, chain drive, Bosch, Amag, lamps, horn, accessories and spares; £44.—Taylor, 28, Mitcham Rd., Tooting Broadway. [5705]

1914 Matchless-Jap 8h.p. Combination, kick start, 2 speeds, free engine, in really good condition, fitted for substitute, a fast, powerful machine; £42.—Letters only, 65, Fordel Rd., Catford, S.E.6. [5748]

1915 Matchless Combination, M.A.G. engine, 3-speed, kick start, hood, wind screen, speedometer, in excellent condition; price 70 gns.; trial by appointment willingly.—234, Gt. College St., Camden Town, N.W. [5601]

1915 Matchless 8B 3-speed Combination, all accessories, beautiful outfit, £89/10; also 1913 2-speed combination, and accessories; £42.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [5689]

1914 Matchless Combination, 8h.p., 2-speed counter-shaft, all chain drive, new tyres, speedometer, lamps, spare cover, tubes, valves, etc., coachbuilt sidecar, Pillion seat, all splendid condition; £50.—101, Tooting Bec Rd., Tooting, S.W. [5831]

Motosacoche.

1914 Motosacoche, 2½ h.p., variable gear, in fine running order, perfect; £15.—Jones, Garage, Broadway, Muswell Hill. [5854]

RIDER TROWARD'S, 78, High St., Hampstead.—1914 Motosacoche, 2½ h.p., variable gear, just overhauled by makers; 14 gns. [5533]

New Hudson.

1913 2½ h.p. 3-speed New Hudson, good order; £15.—Wilderspin, Chatteris. [5752]

NEW Hudson, 2½ h.p., 3-speed lightweight, in nice condition; £19/15.—Motor Exchange, Horton St., Halifax. [5678]

NEW Hudson 6h.p. Twin Combination, 1914; £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [5283]

NEW Hudson, 1914, 4h.p., 3-speed Armstrong, coachbuilt sidecar, complete; £32, or offer.—Reed, Froyle, Alton. [5620]

1914 3½ h.p. New Hudson, 3 speeds, kick starter, clutch, lamps, horn, coachbuilt sidecar; £50.—Surgeant, Bell Rd., Hounslow. [X2873]

RIDER TROWARD'S, 78, High St., Hampstead.—New Hudson, 1916, 2-stroke, 2-speed, 29 gns.; 1915, 2½ h.p., 3-speed, perfect, 28 gns. [5534]

NEW Hudson, 6h.p., twin, 3 speeds, speedometer, lamps, coachbuilt sidecar, in exceptional nice order and condition throughout; £40.—Percy and Co., 337, Euston Rd., London. [5866]

NEW Hudson Combination, 1913, 3½ h.p., 3-speed, kick start, Watford trip, 6,000 miles, perfect, new spare belt, new Dunlop rear, spare luff tube, lighting outfit, unused, grand condition, all accessories; £46.—Port Terry, Odham, Hants. [5643]

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For deals that are square and terms that are fair.

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1912 ABINGDON T.T., fast,  
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1913 DOUGLAS, like new, long  
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pletely enclosed, many  
spares, good lamps, etc. .... £35 pos.  
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Second-hand C.B. Sidecar .... £3 0 0

Information and Advice FREE.

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Green Terrace  
(near Turnham  
Green Station),  
LONDON, W.



## MOTOR CYCLES FOR SALE.

New Imperial.

NEW Imperial, 1917, 2½ h.p., 3½ h.p., 6h.p. models, in stock.—Crow Bros., Guildford. [2563]

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805]

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—1916 New Imperial, 2-speed, 26 gns.; 1915 ditto, 24 gns.; both as new. [5535]

NEW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0839]

NEW Imperial-Jap, Oct., 1915, 2½ h.p., 2-speed, 2 lamps, horn, new tyres, excellent condition; £27.—66, Howarth Rd., Plumstead, S.E. [5732]

NEW Imperial-Jap, 2 speeds, coachbuilt sidecar, in real good order and condition; £34.—Percy and Co., 337, Euston Rd., London. [5868]

NEW Imperial-Jap, 1915 model, Sensap carburettor, generator, and head lamp; price £23.—Hall's Garage, Ltd., Motor Agents, Stevenage, Herts. [5649]

NEW Imperials, 2 speeds, clutch, and kick starter, and ladies' models, in stock for immediate delivery.—P. J. Evans, 87-91, John Bright St., Birmingham. [X2987]

NEW Imperial, 1916, 2½ h.p., o.i.v. N.I. engine, 2-speed; £24; at Cannock, Staffordshire Police Station.—Miss Despard, Hinton House Hospital, Crewkerne. [X3029]

WE Can Give Immediate Delivery from stock of the 1917 New Imperial-Jap, 2½ h.p., price £40/19.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0481]

NEW Imperial-Jap, 1915, 2½ h.p., 2-speed, head lamp, generator, rear lamp, all accessories, good tyres, fully equipped; £25.—Advertiser, 156, Gt. Portland St., W. [5844]

NEW Imperials, 1917 models, for immediate delivery. No. 1 39 gns. No. 2 46 gns.; two new 1916 models No. 1 at £38.—Colmore Depots, 211, Deansgate, and 31, Renshaw St., Liverpool. [0886]

NEW Imperial-Jap, 2½ h.p., 1916, £32/10; 2-speed, new, 39 gns.; 2-speed, clutch, and kick-starter, new, 46 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [5895]

NEW Imperial, 1915, 2½ h.p., 2-speed, new 1917 cylinder, piston, valves, and shaft, bearings rebushed throughout, new heavy Dunlop tyres, all accessories; £25.—Townsend Cycle Stores, Bury St. Edmunds. [X2944]

1916 New Imperial-Jap, absolutely new, never been used; first cheque for 32 gns. secures this bargain.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealer in the South. 'Phone: 1024. [0915]

1917 Brand New Imperial-Japs, fitted with 2-speed gear and free engine, £40/19; also clutch models in stock, h.h.c. clutch, and kick starter, £7/7 extra; extended payments 2% extra.—Wauchope's, 9, Shoe Lane, London. [5794]

NEW Imperial, 2½ h.p., 2-speed gear, 39 gns.; extended payment terms, deposit £8/4, and 12 monthly payments of £2/16; clutch and kick starter models also in stock, £48/6.—Harrods, New Motor Showrooms, 118, Brompton Rd., London, S.W.1. [5819]

N.S.U.

5-6h.p. N.S.U. Engine, Bosch mag., 2 speeds; £8.—50, Etherley Rd., West Green, London, N.15. [X2754]

N.S.U. 6-7h.p. Twin, 1914, loop frame, rear springing, kick starter, 2 speeds, Millford Corvette sidecar, extra large coach body; £37/10.—Eagles and Co., High St., Acton, W.3. [X2981]

N.U.T.

RIDER TROWARD'S, 78, High St., Hampstead.—1915 T.T. Nnt-Jap, 3½ h.p. twig, a.h.v.; 37 gns. [5537]

N.U.T., 1914, 3½ h.p. twin J.A.P., 3 speeds, in real good order and condition; £32.—Percy and Co., 337, Euston Rd., London. [5882]

O.K.

RIDER TROWARD'S, 78, High St., Hampstead.—1916 O.K.-J.A.P., 2-speed, as new; 26 gns.; [5536]

O.K. Juniors.—Call and inspect at the N.W. district agent, P. J. Youngs, 2-3, The Parade, Kilburn. [0910]

1916 O.K., 2-stroke, in perfect order, as new, single-speed; £19.—Jones, Garage, Broadway, Muswell Hill. [5855]

O.K. Junior, 2-speed, new; 42 gns.; E.P. no extra, or exchange.—Service Co., 292, High Holborn, London. [5896]

P. and M.

P. and M., 3½ h.p., 2 speeds, and underslung sidecar; £22/10.—Motor Exchange, Horton St., Halifax. [5675]

WELL-KNOWN Distributing House has for immediate sale six P. and M. 1914 and 1915 models, 3½ h.p. motor cycles (2-speed chain driven), with sidecar chassis mounted with specially constructed delivery van, for which they have no further use; loading capacity 200 lbs. These cycles are recommended for their light running costs, the petrol consumption being about one-fourth compared to a Ford. Just the thing for users requiring small runabout in these days of petrol shortage. Usual equipment with each. £60 net cash. Arrangements made for expert tuition.—Box 1,087, c/o The Motor Cycle. [X2963]



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## Concrete Roads.

THE roads of this country have, in most parts, been deteriorating rapidly owing to the heavy traffic consequent upon military activities and the absence of adequate repair. A certain amount of patching has been done, and town and suburban roads have been tar-sprayed. The latter process is, however, of but little use to the motor cyclist unless the pot-holes are first filled, preferably with Tarmac or some filling of a like nature. The spraying alone does nothing to mitigate the pot-hole nuisance; in fact, we are not sure that it does not make the roads more bumpy by hardening the ridges and lumps.

Any information, then, regarding the construction and maintenance of roads becomes more than usually interesting at the present time, and we welcome the report on the subject of concrete roads which has lately been prepared by Mr. H. Percy Boulnois, M.Inst.C.E., at the request of the Roads Improvement Association, and to which we referred briefly last week.

Concrete roads have been used to a considerable extent in America, and it has been estimated that there are at the present time at least 50,000,000 square yards of concrete roads in the United States. In Canada, also, this method of construction has been largely used, but in the British Isles it has been much neglected, except in some few districts, notably Chester, Dunfermline, and an experimental road near Gravesend. (Kent, by the way, is possibly our most progressive county in the matter of roads.)

The cost of laying down a concrete road, excluding the excavation and formation of the sub-base, the charge for which must necessarily vary considerably in different localities, amounts to about 5s. per square yard, but when the work is once properly done the cost of maintenance would be very trifling. Such a road, well made, would be a source of constant joy to the motor cyclist.

## The Cooling Fins of Steel Cylinders.

RECENTLY a correspondent advanced the theory that the word "radiation" is wrongly applied in connection with the cooling of a motor cycle engine—that cooling is effected not by radiation but by the impingement of the current of air on the fins of the cylinder. This observation is, perhaps, not new, yet it affords food for reflection. If in designing the fins of a cylinder radiation need not be taken into account, and the real point for consideration is the catching of the current of air in such a way that it impinges on the cooling surfaces to the best effect, then revision is certainly necessary in a great many designs. In other words, the fins may be so arranged that, though giving an efficient radiating surface, only a very small portion of this surface actually comes in contact with the rush of air—the flat twin having circular fins being a ready example. In this instance, there are no currents of air passing at high velocity between the fins, as is the case in a flat twin having longitudinal fins, yet both types of engine have proved themselves efficient as regards cooling.

There is no doubt that in the case of cast iron cylinders, in which the fins are comparatively few and far between, the disposal of the fins makes little difference so long as the total cooling surface is sufficient, yet we certainly think that when steel cylinders are used, in which the wafer-like fins are crowded closely together, they should be so arranged that the blast of cool air created by the passage of the machine circulates forcibly and freely between the fins, so as to prevent the hot air remaining latent and imprisoned in the narrow grooves. However, in the case of the flat twin with circular fins free circulation and impingement of the air over the total radiating surface could be effected by freely drilling the fins, so that the current could circulate between them.



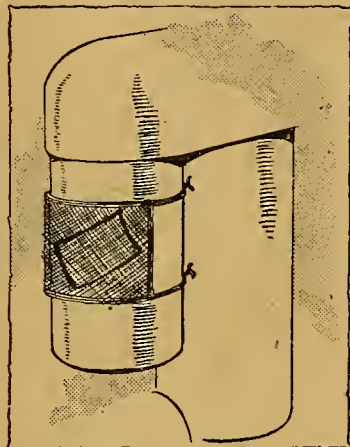
# IDEAS: Useful and Ingenious.

Spring R. Jones



## TO PREVENT DUST IN THE ENGINE.

THE extra air inlet on many carburettors has no covering over it, hence dust is apt to get carried into the engine. To prevent this, make a square frame of thick copper wire, as shown, so as to cover the opening with plenty of fine spare. Bend the edges of a piece of fine

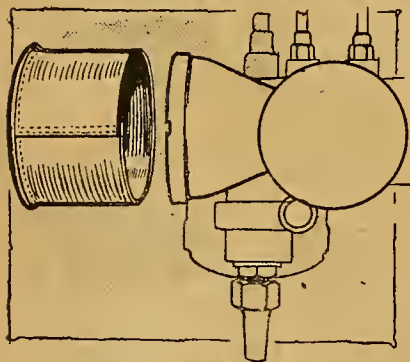


Preventing dust being drawn into the engine through the air intake.

copper gauze, a little larger than this, round the frame, and dish it out in the centre. Then fix it round the air chamber with another length of wire.—G.F.J., Sheffield.

## ANOTHER EASY STARTING DEVICE.

A SIMPLE, easily made, and inexpensive device for machines fitted with a Senspray carburettor, which will greatly facilitate starting up, particularly in cold weather, is a bag made of soft leather, and so fashioned as to be a nice sliding fit over the gauze

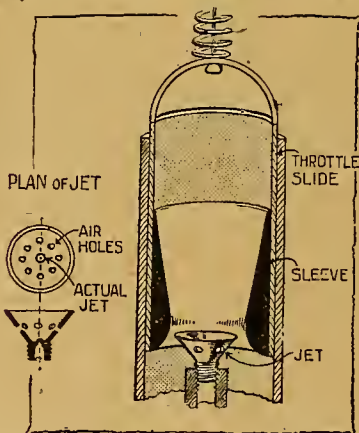


A device for facilitating starting when using a Senspray carburettor.

air-take. The gauze may be taken off for purposes of fitting, and any girl or housewife handy with the needle could make one in a few minutes. When in position over the gauze it will be found that the machine will fire with the first kick, upon which the leather cover should be drawn off by degrees, and the engine will settle down to its work. The bag can then be placed in the head lamp ready for the next occasion.—J. Dodd, Audley, Staffs.

## CONVERTING A 1912 DOUGLAS CARBURETTER.

IN the 1912 carburettor there is a separate choke tube and jet with extra air inlet. For town work it is a great convenience to have only one lever, i.e., the throttle, to manipulate. This is done by removing the throttle slide, jet, and then the choke tube. Obtain from Douglas Bros. (or agents) a jet for a 1916 Douglas carburettor. This consists of a saucer-shaped piece of brass, with air holes and the jet in the centre. In the lathe turn



Section of a Douglas carburetor converted to work automatically, showing the throttle nearly closed.

a sleeve of brass to fit inside the existing throttle slide. This should taper from the size of the jet saucer at the bottom to nothing at the top (see sketch). As shown, this is soldered inside the throttle slide. This is so arranged that when the throttle is nearly shut all the air goes through the air holes in the saucer. This increased my mileage per gallon from eighty-five to about 100. Such a jet should be chosen that unless at full throttle no air can be given. For heavy fuels solder a gauze disc across the top of the "saucer."—G.F.J., Sheffield.

## A GUARD FOR OILY CHAINS.

MANY machines without covered chains have a nasty habit of scattering oil very freely, and especially on to one's trousers. A chain guard to obviate this can be made thus: Cut out a piece of sheet metal—aluminium

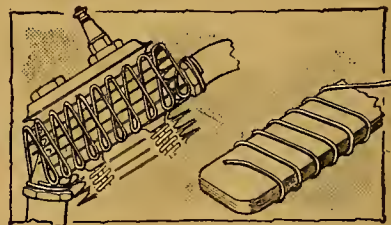


An easily made chain guard.

for preference—to suit the machine in size. Bend over at the dotted lines. The end A clamps (in the case of most two-strokes) under one of the cylinder holding-down nuts. B is fixed to a bracket carried by the nut holding down the gear box, shaped as in the sketch, and made of  $\frac{1}{2}$  in. sheet iron. This does not interfere with the removal of the chain, and to riders who do a good deal of town riding in ordinary attire it will be found a useful device.—G.F.J., Sheffield.

## A TROUSER GUARD FOR A ZENITH.

THIS is a very simply made, yet very effective, guard to prevent the overalls being burnt by the back cylinder of a 5-6 h.p. Zenith. It could be fitted, of course, to any twin of similar make. Obtain first a lath, about  $\frac{1}{4}$  in. thick and  $1\frac{1}{2}$  in. wide, and also some 14 S.W.G.



A trouser guard made from 14 S.W.G. galvanised iron wire.

galvanised iron wire. Wind the wire around the lath fairly closely till about a 6 in. length of spring has been formed. Then clip one end round the inlet pipe of the back cylinder, and the other end round the exhaust pipe, and no more trouble will ensue.—G.F.J., Sheffield. [This idea is practically identical with the Dall trouser guard which has been on the market for some years.—Ed.]



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"IXION"

## The Direct Belt Drive.

WHEN "K.A.H." appeals for the survival of the direct belt drive on  $3\frac{1}{2}$  h.p. machines he is up against the dislike of manufacturers to the production of two fundamentally differentiated models, up against the technical difficulties in the way of fitting such machines with variable gear, and up against the sidecar. Engine-shaft and hub gears have never been really satisfactory; single gears only appeal to a minority of purchasers. I believe the only hope for the direct belt drive depends upon price. If I saw my way to produce a first-class belt-driven single at £20 less than is charged for standard touring types, I believe I could rely on selling at least 10,000 per annum. They would be bought by "first machine" customers, by the impecunious; and by speedmen; in other words, they would appeal to a peculiar and a restricted market. But until the sidecar is finally ousted by the perfect cycle car, the variably geared, two-step drive machine has it whacked to the wide; and when the perfect cycle car arrives the lack of a sound hub or shaft gear will continue to militate against it.

## Average Speed.

THE Critics "take a far more pessimistic view of this subject than the average roadburner can endorse; but "The Critics" are right—first, because the ordinary speedometer exaggerates fearfully when its needle passes the 35 m.p.h. mark; and, secondly, because men maintain high speeds for half an hour on selected roads, and jump to the conclusion that they could keep up the same speed all day long if they were pushed. I find that the average  $3\frac{1}{2}$  h.p. solo mount usually gives its best running at about 33 m.p.h., and that most young riders keep it travelling at somewhere about that speed when they are in the saddle. But they slow down to perhaps half that speed through towns and villages, and they do not make up traffic losses in between centres of population. They lose a little more on hills, and some more on dismounts to imbibe, or to light a pipe, or to look at a view. Very few of us attain a 26 m.p.h. nett average on a full day's cross-country run. In a sixty-minute test it is the easiest thing in the world to crowd thirty-five miles or so into the hour; difficult to reel off forty; and almost impossible to cover forty-five, except with a very fast machine on carefully picked roads. After such a test no sane man cares to reel off a similar distance in a second consecutive hour. In the six-day trials most of the riders average about 30 m.p.h. between checks; and anybody who watches them will recognise that the men are not scrapping or riding to anybody's danger, but setting such a pace as the average tourist automatically adopts. A very few minutes off the saddle lower such an average amazingly, so that a holiday maker who makes brief

stoppages at every point of interest and takes his meals comfortably, finds at the end of his day that he has averaged less than legal limit, though his speedometer may have been fairly steady at just over 30 m.p.h. while he was in the saddle.

## Improving with Age.

WHEN I first rode the  $3\frac{1}{2}$  h.p. A.B.C., I fancy my only criticism was that it did not hold on to its higher gears very sturdily, showing a lack of flexibility upon them, and a tendency to prefer second gear uphill. The engine in question has now got a big five figure mileage behind it, and, curiously enough, its top gear work improves steadily. Owing to the weight which results from a complete spring suspension, a four-speed gear box and other fal-lals, it cannot, of course, climb or pick up on a 4 to 1 gear as a stripped  $3\frac{1}{2}$  h.p. T.T. with direct drive would do; but it will now hold on to fourth gear, and register over 40 m.p.h. on that gear, up hills where it asked for second gear in the days of its youth. It looks as if I had originally done the engine an injustice in thinking that it failed to combine abnormal revolutions with dogged work on a high ratio; but the engine revved so freely from the start that I never suspected it of any hidden stiffness.

## A Change-over.

FRESH from a long ride on the four-speeded spring-framed A.B.C., I went out on a light T.T. single-geared Norton, and verified some of my old opinions. For a lazy man the good heavyweight is undoubtedly the most convenient machine. It is easier to start up, because you have only to push it slowly for a foot or two, whereas the light single-gear has to be pushed fast for yards. It is far more comfortable, because its weight pins it down on the road, and it has an ampler springing system. It scores on every conceivable point bar two, namely, that the petrol consumption of the lighter mount is a good deal lower, and that the simplicity of the T.T. machine ensures the minimum of trouble. I find it rather difficult to believe that the road-racing-type of machine will be able to hold its own against the more liberal specifications, unless they are sold at a considerable vantage in price. Improvements in design and workmanship prevent complexity from being formidable, and if the T.T. is the faster mount, the full specification gives all the speed which ordinary people want on the road, and the latest types of engine afford terrific acceleration with the aid of the gear box. The Norton racer can only outpace the A.B.C. tourist on those rare pieces of road where you can get going on full throttle; and a three-speed gear, supplemented by a good driver and a willing engine, can pick up at least as fast as a crack engine which has only one gear to depend on.



## SOME HOME-DEvised SIDECAR REFINEMENTS

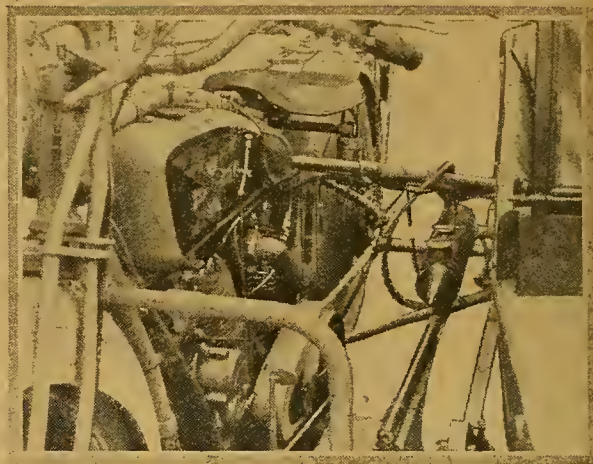
Many Unusual Additions Carried  
into Practice by the Rider of an  
American Excelsior.

THE machine to be described is a 1916 American Excelsior sidecar outfit. The points and details of this machine are well known, and therefore only a brief specification need be given. The engine is 7-9 h.p. (84×89 mm.); overhead inlet valves; three-speed car-type gear; interconnected hand and foot controlled clutch; Splittorf mag-dynamo electric lighting and warning system. The various incidentals or "gadgets" embodied in this machine are the subject of this article, and many of them may be described as home-designed "patents," being the work of an enthusiastic rider who is fortunate in being able to carry his ideas into practice.

Dealing firstly with the petrol-paraffin apparatus. The usual bicycle tank contains the substitute, while a half-gallon "aeroplane" tank (containing petrol) is fitted to the sidecar tube at the rider's feet. This tank is at a lower level than the carburetter, and has, consequently, to be pressure fed. This is effected by means of a bicycle pump fixed on the side of the tool box at the rear.

The tank is fitted with a pressure gauge reading up to 8 lb., which is sufficient for ten or twelve starts. The tank stopper has a piece of straight brass soldered across to give a hand grip and ensure a pressure-tight joint. The feed pipe from this tank leads to the carburetter pipe, and through a T-piece to each compression cock, with stop tap between, so that one can inject petrol into cylinders or carburetter. This does away with the necessity of opening the toolbox or disturbing the passenger to search for a petrol injector.

There is no need to tickle the carburetter with this system, as the petrol fairly "explodes" into it, thus giving it a good wash round and doing away with the necessity of draining by so



The small "aeroplane" petrol tank is attached to the sidecar tube, and is fitted with a pressure gauge.

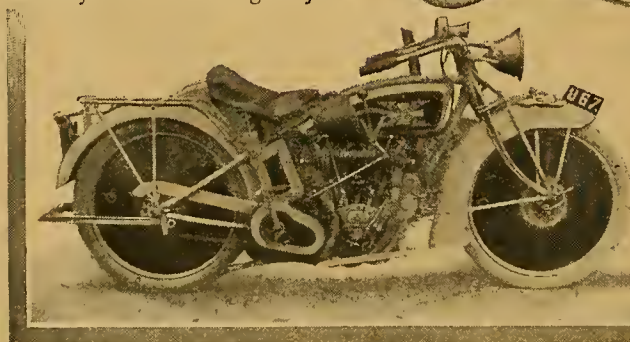
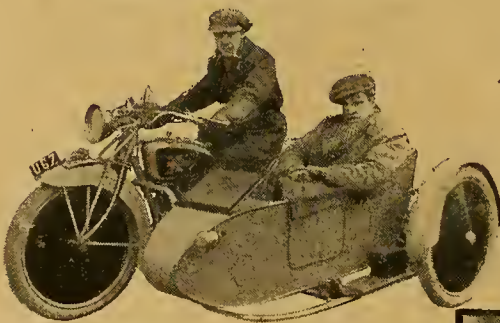
diluting the remaining substitute as to render this unnecessary.

### Warning the Carburetter.

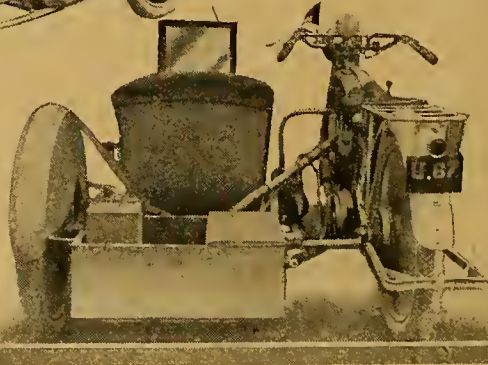
The carburetter, which is a Schebler, is situated between the cylinders, so that each side of the float chamber practically touches them, deriving full benefit of their warmth. The carburetter is also supplied with hot air drawn from the cylinder walls at the bottom or main air intake. The crank case release also blows hot air into the muff surrounding the air intake. The extra air (automatic) is fed by 1½ in. diameter pipe from the rear exhaust pipe. This pipe is made from a hot water angle pipe, a soda water bottle clip, and a bit of old cycle tubing.

The Splittorf mag-dynamo works in conjunction with a C.A.V. 6-volt accumulator, and supplies current for head, tail, and sidecar lamps, horn and starting switch. The front lamp is fitted with a town light of 2 c.p. and a large bulb of 12 c.p. for ordinary country work. The sidecar has a 4-volt lamp at the front and a 2-volt red rear light, running in series.

The 7-9 h.p. Excelsior (84×89), to which many useful refinements have been added.



General view of the machine. Hot air is taken from the exhaust, also from the cylinder, and utilised to aid carburation.

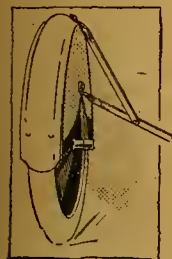


Mudguard and stays on sidecar, tool box, and pump to petrol tank.



## Some Home-devised Sidecar Refinements.—

The sidecar is equipped with windscreen (home-made) and dash, on which are fitted a zero centre ammeter, voltmeter, and switches. One switch—three-way—gives "off," "sidecar lights," and "voltage" respectively; the other switch shorts the bicycle circuit and defeats the small boy element, which is thus thwarted in its attempts to "blow the horn"!



Special sidecar mudguard and extra stays.

A spring wheel to the sidecar has been found absolutely necessary, as anyone who has ridden far over the present Yorkshire roads and has occasionally put his hand on the sidecar chassis will realise. The axle to which the wheel is fixed is a floating member, bushed at the bicycle end, and lubricated by a Stauffer on the under side to keep the water out. Acting in a cross lug at the outer end, and having a plunging rod through this cross lug controlled by a strong Chater-Lea spring which is adjustable, a rubber buffer is fitted to take the rebound. This has proved very effective after long test. It is perhaps specially interesting, succeeding the spring frame designs illustrated in *The Motor Cycle* of June 28th. Among its chief recommending features is its extreme simplicity, though some little experimenting was necessary before the correct spring strength was found.

## Other Sidecar Refinements.

To return for a moment to the sidecar dashboard, this is triangular in shape and hollow, the windscreen being hinged on the top. The hollow of the board is used as a wiring board, and is detachable by unscrewing four screws.

The sidecar mudguard is also worthy of note; it is a Chater-Lea, coming right down to the frame on the inside, completely shielding the passenger, while the method of fixing prevents all rattles.

To the rear of the sidecar is fitted a large box, one end having a lock-up lid for spares and tools, and also having the accumulator fitted inside in a separate teak box, locked firm and *unspillable*, but quickly detachable.

A clamp for holding down petrol cans—of which two can be comfortably carried without fear of becoming loose or rattling—is included.

Sidecar dashboard, windscreen, zero centre ammeter, voltmeter, three-way switch, and "contact" switch.

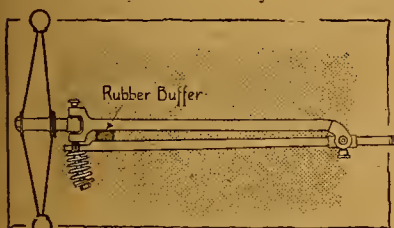
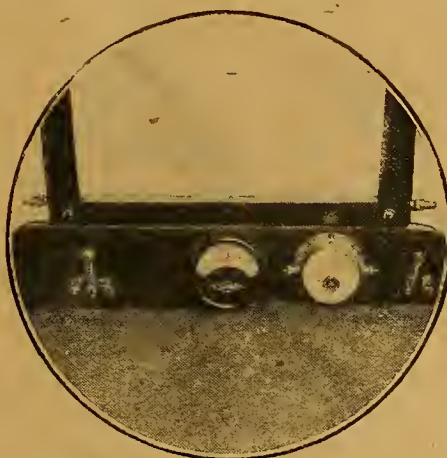


Diagram showing the method of springing the sidecar wheel.

Note will be made of the ample storage room for fuel. This is highly necessary if one does not desire to be stranded, which

under present conditions is one of the easiest of consummation. The total quantity of fuel that can be carried aboard is: Bicycle main tank,  $1\frac{1}{2}$  gallons fuel; bicycle oil tank,  $\frac{1}{2}$  gallon oil; starting tank,  $\frac{1}{2}$  gallon petrol; two tins, 4 gallons: or sufficient without replenishing to run 450 miles.

The machine itself affords a very comfortable riding position, the saddle being very low and permitting an unusually extravagant motion owing to the combination of the spring seat-pillar and well-sprung saddle.

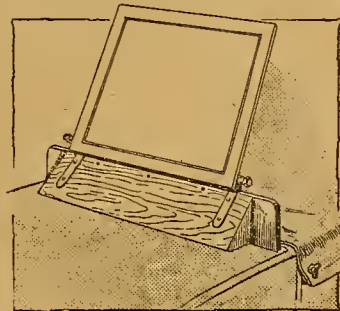
The handle-bars are very comfortable, though scarcely wide enough for the T.T.-bar enthusiast.

The outfit is fitted with scarlet disc wheels all round to harmonise with the colour scheme, which is grey and scarlet. It looks very fine, and is always the centre of a curious and envious crowd when the rider dismounts—often to the verge of becoming embarrassing, particularly when the experts come along and diagnose the pressure gauge. Their remarks on this instrument are wide and varied.

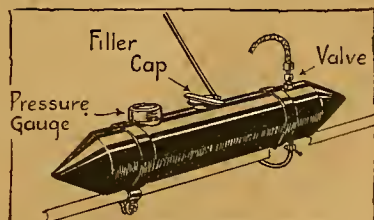
As the mechanical pump has been found to give an unsatisfactory supply to the front cylinder, the details of the oiling system have been rearranged, and subsequently have proved entirely satisfactory. The mechanical pump now feeds main bearings only—a sight drip feed having been incorporated with the original hand pump, to which a compression spring has been fitted. This pump now feeds the front cylinder only. Part of the apparatus has

been made from an old incandescent burner, the by-pass acting as the drip feed adjuster! The crank case oil overflow feeds to the front chain and gear box respectively. The clutch is also running in oil, and thus the whole power unit—gear box, clutch, and both chains—is automatically oiled. The inner disc of the sidecar wheel is fixed permanently, while the outer disc is held simply by a bicycle bell top screwed on to the hub cap. It is instantly detachable for tyre repairs or blowing up the tyre, and in addition it has no protruding screw heads.

HUGH  
BROCKLEBANK.

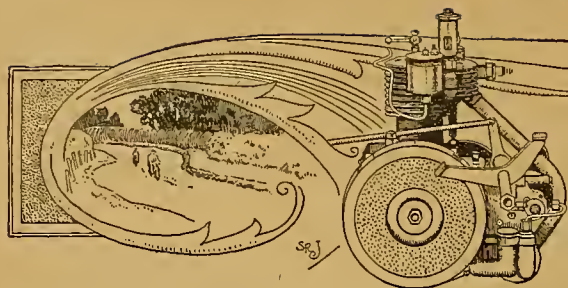


Adjustable home-made windscreen.



Extra tank for petrol for starting purposes.





## HEAT IN MOTOR CYCLE ENGINES,

And a Suggestion for Using some of this Heat to Advantage.

**U**NDER this heading it is proposed to deal only with that type of engine with which the motor cyclist is generally brought in contact, namely, the air-cooled petrol engine, and to explain the conditions in which a petrol engine should run, conditions which every motor cyclist should bear in mind if he wishes to obtain the best results from his mount. It is, however, common knowledge that ideal conditions are, in practice, unattainable.

It must be understood that a petrol engine is, in effect, a hot air engine; that is, it depends for its power upon the heating of air by the combustion of petrol and the expansion thereby promoted. It is obvious, therefore, that all the heat carried off by cooling arrangements is wasted. It is found, however, that the mechanical parts of an engine cannot perform their duties at such a high temperature as would exist if the engine were not cooled. From a mechanical standpoint the engine should be kept at as low a temperature as possible. On the other hand, as little heat as possible should be wasted. The extent to which an engine is cooled is, therefore, a compromise. The temperature of any part of an engine should never exceed 500° Fahr. except instantaneously. On the other hand, it is undesirable that the cylinder head should be at a lower temperature than 180° Fahr. The most efficient mean running temperature is generally about 200° to 300° Fahr. In order to keep the engine at this a great quantity of heat must be conducted away from the cylinder head and walls and from the valve pockets. This is generally effected in motor cycle engines by fins cast integral with the cylinders and exposed to the air. These fins, being of cast iron, are fairly bad conductors of heat, and are in most cases far too short.

### The Best Metal for Radiating Fins.

In practice it is found almost impossible to over-cool the cylinders of an air-cooled engine. Therefore, it is possible to improve the general running, and particularly the oil consumption, of most engines by fitting to the cylinders and valve pockets generous radiating fins of sound design. These fins should be made of a metal of high heat conductivity. The reason for this is obvious. Another quality of the metal used requires consideration, namely, the specific heat. A metal of high specific heat has the advantage of absorbing a large quantity of heat without an undue rise in temperature. The most suitable metal as regards conductivity is copper, which has a low specific heat. Aluminium has a slightly lower conductivity, but a very high specific heat, and is probably more efficient for the purpose of radiating fins than copper, although copper is preferred by some, on account of its high heat conductivity.

The method of attachment of radiating fins is rather a moot point. Many contend that sheets of metal forced in between the cast iron fins of the cylinder introduce a large bulk of metal to hold the heat generated. It is generally understood that only the temperature, and not the quantity of heat stored, affects the running of an engine. If the bulk of metal mentioned is cooled sufficiently to keep it at the required temperature it can do no harm. It does not require larger radiating fins, since the temperature being constant the heat conducted away must be equal to the heat delivered, which is the same with or without an intervening bulk of metal. One drawback, however, of a bulk of metal is that it requires a longer period of running to raise the engine to normal running temperature, since the engine has to provide a greater quantity of heat to raise the larger mass of metal to the required heat. Here, again, the question of specific heats must be considered. Obviously the metal of lower specific heat will warm up more quickly, which adds a point in favour of copper. It seems that for an engine which pulls moderately well while cold aluminium radiating fins are the better, while for an engine which must be raised to a fairly high temperature before it will give reasonable power copper has the advantage.

### Masses of Metal.

With regard to masses of metal about the cylinders, any such masses which are not efficiently cooled will rise to a high temperature and maintain this temperature for a considerable time. Such fittings as the valve caps, sparking plug bodies, etc., should, therefore, be provided with some cooling devices.

One of the most frequent causes of knocking is pre-ignition. Even an engine with sloppy bearings will not knock easily unless pre-ignition is taking place. Knocking almost invariably takes place when the engine is labouring and developing undue quantities of heat. Three things may cause this distressing phenomenon, the spark taking place too early, an excess of carbon deposit in the cylinder head, parts of which become incandescent, or an incandescent sparking plug point. The latter is the most fruitful cause and the hardest to cure. In the majority of sparking plugs the electrodes are rather small and pointed. The points are subjected to a very high temperature, and there is insufficient metal to carry off the heat from them. This trouble is generally cured by the use of a good single-point plug with a stout central electrode bent to approach the side of the body of the plug. In some cases this is insufficient, and in all cases matters are improved by furnishing the central electrode with a large cooling fin, as is done in racing and aero plugs.



**Heat in Motor Cycle Engines.—**

One of the most neglected parts of an air-cooled engine is the exhaust port. This should be provided with ample cooling fins to keep the temperature as low as possible. The exhaust pipe should also have some cooling device, extending for a length of at least six inches from the port. The hot gases issuing from the cylinder past the valve will then be suddenly cooled, and consequently will contract. This contraction reduces the pressure in the exhaust pipe on the principle of the condenser of a steam engine, thereby assisting the quick withdrawal of the exhaust gases from the cylinder, and, as an additional result, contributing to the problem of the efficient silencing of the engine.

**Warming the Jet.**

So far only the removal of heat from the engine has been discussed. A further question presents itself. Can we use any of this heat? Certainly; but only a small, though most valuable, part. Every motor cyclist knows that a carburetter is the better for being warmed. Firstly, the petrol pipe and float chamber should be kept as cool as possible to avoid undue evaporation. The jet, however, should be kept at a temperature just below the boiling point of the spirit used. This temperature is in the neighbourhood of

185° Fahr. This may be done by leading a lagged copper rod from the jet through the wall of the carburetter and into the exhaust pipe. The copper rod should be soldered round the top of the jet, not impeding the flow of spirit, and should be made of ample diameter. If the jet gets too hot its temperature may be reduced by filing the rod so as to reduce its cross-sectional area. The induction pipe also needs warming. This may be easily accomplished by enclosing it in a jacket connected with the exhaust pipe by a lagged copper tube and regulating tap and provided with an exit. The air supply of the carburetter should also be warmed by drawing it off the radiating fins of the cylinder. For easy starting the copper rod may be heated by means of a small lamp with perfect safety if care be taken. A carburetter so fitted up will vaporise a heavier fuel without difficulty, and its performance with ordinary petrol is distinctly improved, provided that the various temperatures are correctly regulated.

Any motor cyclist working on these lines may improve the general running and petrol and oil consumption of his mount with very little expense and labour. The attention of manufacturers of motor cycles might with considerable advantage be drawn to possible improvement in these directions.

SPEED IRON.

## AN IDEAL MOTOR CYCLE.

An Enthusiast of the Four-cylinder Engine outlines his Perfect Motor Cycle.

EVERY motor cyclist has his own ideas of what constitutes a perfect motor cycle, and the specification below is drawn up from the experiences of riding a four-cylinder F.N., the chief disadvantages of which are: Irregular running, due to a.o.i.v.'s, high petrol consumption, and noisy bevel gearing. Apart from these, this machine might practically be called perfect.

It is a peculiar thing that the four-cylinder motor cycle has never come into its own. From all appearances, however, the motor cycle de luxe will have an increased market after the war in the ranks of car owners who live in the country and have hitherto considered motor cycles only fit for young bloods.

Behold, now, the outline of a proposed Rolls-Royce motor cycle:

**ENGINE.**—Four-cylinder, each cylinder 1 h.p., mechanical inlet valves, "T" head engine, air-cooled, engine inclined so that a one-step shaft drive may be used to a helical bevel drive on the back hub, semi-automatic carburetter, enclosed valves.

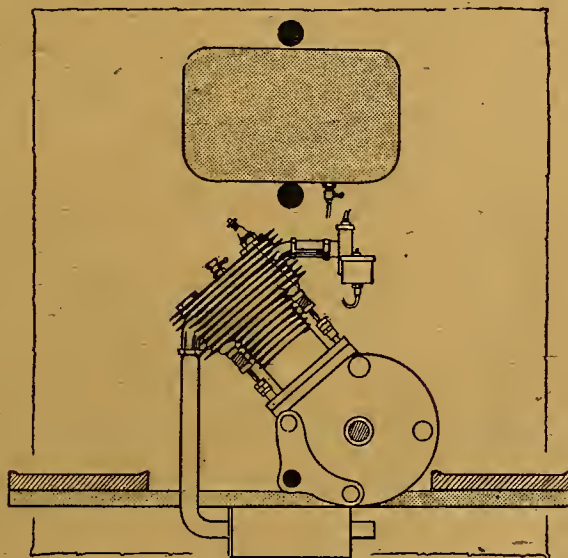
**DRIVE.**—By shaft throughout, F.N. type two-speed gear box.

**OTHER DETAILS.**—Plate clutch, hand controlled, kick starter, gear-driven magneto and platform for fitting an electric lighting dynamo (to be fitted optionally at choice of buyer), broad American type handlebars (not twist grip control), rubber pneumatic hand grips, aluminium footboards, Brooks B170 saddle, Indian type spring frame, black and gold finish.

Such a machine would fulfil every desire of the most critical rider—slow running, acceleration, speed, hill-climbing and steadiness on grease, no vibration, and it would be able to take a sidecar. The four-cylinder engine would be practically silent, and with proper design should give seventy-five miles per gallon (*vide* Bébé Peugeot light car). If a sidecar were used per-

manently a heavier model with four-speed gear box should be marketed (which would necessarily not be so suitable for solo work).

C. IVOR THOMAS, 2nd Lt., R.F.A.



End view of a four-cylinder engine inclined to give straight through shaft drive.



# THE TRAINING OF A DESPATCH RIDER.

## A TWO DAYS FIELD SCHEME DESCRIBED.

**A**FTER reading the very excellent account of the training of a despatch rider in the issue of *The Motor Cycle* for 24th May, I should like to pen a short description of the two days' field scheme written from the point of view of a recruit going through this part of his training.

As one who entered a motor cyclists' training camp as a recruit, and after passing out was retained in the company for many weeks, engaged on the work of training others, I can truthfully say that I always thoroughly enjoyed these schemes, as they provided an entire change of scenery, were full of life and bustle, and brought new experiences every time. Whatever the weather—rain or shine—however bad the roads—mud or snow—I was always ready for Thursday morning to come round.

### Before the Start.

Picture with me the scene on a Thursday morning. Everywhere hurry and bustle as about 200 motor cyclist recruits are getting their machines ready. Some wheeling them out of the bays—where they are kept—to the parade ground, others fastening blankets and ground sheets on their carriers, and others again drawing rations and handing round loaves, cooked joints, tins of salmon, milk, fruit, jam, and so on, to their comrades to stow away in carrier boxes and haversacks. Some of the unfortunate ones have discovered flat tyres and other defects which have to be hurriedly remedied, and many are trying to start refractory engines in order to warm them up. Everyone is asking questions. "Where is the scheme? Do we concentrate at Abingdon or Thame?" says one. Another chimes in that he expects this is the week to go to St. Ives, and a third suggests it might be Beaconsfield. While this is going on a corporal is handing out maps, and this gives some idea of the direction of the scheme. On the way down to the parade ground machines are being rapidly booked out, and on the parade ground itself the work of lining up the machines has commenced.

### Preparations Complete.

We find our marker and learn that we are the Fourth Corps, and the majority of us are undoubtedly pleased we are on a corps, as we see we have more D.R.'s than the divisions, and on telling our friends in the divisions this, they reply that we shall have three times as

much work as the divisions, so we wonder whether we are the better off after all. However, we are very keen and want to pass out, so we do not mind the work.

"Tion!" says the "Esses Emma," and the heels of 200 recruits come together with a click, like one man, each standing by his machine and ready for the road. We are told that we are to proceed to Benson by routes given to us, which are not all the same, although they all lead to the point of concentration. We now find that, instead of driving on main roads, as the majority of us have always done, we have to proceed on second and third-class roads by devious routes. We have by this time learned a little about map reading, and notice a good many contour lines crossing and recrossing our route, so we know what to expect.

Off we go, the "army" first, then the corps to which we are attached, and lastly the divisions. We are sent off singly at about thirty-yard intervals. Laughing at others attempting to start cold engines is great sport, but before we know where we are it is our turn to start, and, tickling the carburetter vigorously, nay, almost feverishly, we give one big push, and our Zenith fires, and we are away smartly, slowly running the gear up to top. We know the first few miles of the road, over which we have previously route marched, and, the machine pulling well, we feel happy as sandboys. Presently our attention is taken reading the map and watching the character of the country, looking for landmarks, such as churches, windmills, woods, etc., and carefully checking them with the map to ensure keeping on the right route. This we do whilst riding.

### A Bit of Bad Road.

Many of the roads on the map marked as second and third-class turn out to be mere field tracks, and presently we get into some deep ruts and take a toss. This bit of so-called road seems absolutely unride-

able, so we stop awhile to see how some of the others get on. A Douglas rider just gets through, followed by another, who thinks it is "easy," and comes off. A B.S.A. takes it at walking pace on low gear and waddles through corkscrew fashion. A rider on a Triumph comes howling along in fine style, but much too fast, and then suddenly comes to grief. After watching a few more get



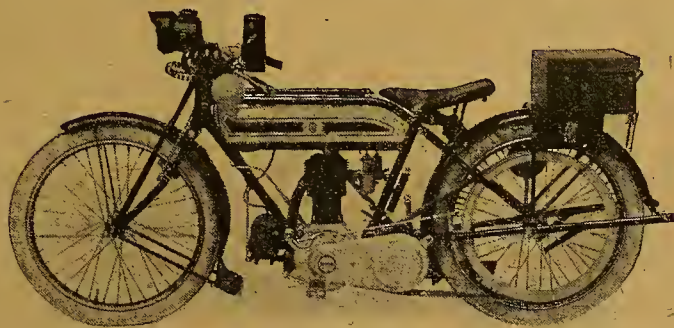
A good deal of discussion has taken place recently respecting the dangers of lorries to despatch riders. Needless to say, ideal conditions, such as the illustration shows, do not obtain in France near the fighting line.



THE

**TRIUMPH****T**

HUNDREDS of letters  
of appreciation have  
reached us from Officers  
and Despatch Riders,  
expressing highest satis-  
faction at the outstanding  
reliability of their  
TRUSTY TRIUMPH.

**T**

TRIUMPH CYCLE CO., LTD., COVENTRY.



# NORTH BRITISH CLINCHER

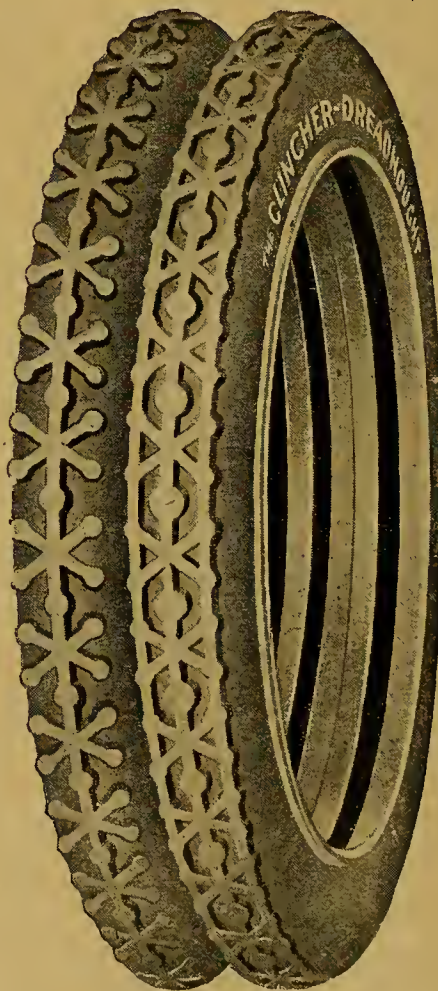
## Motor Cycle TYRES

*Riding on "Clinchers"  
is Real Comfort*

CLINCHER Tyres will carry you out to the country or the sea-side with the maximum comfort and minimum tyre-trouble.

For "Clinchers" are remarkably resilient and yet extremely durable and puncture-tough. That is because, in their manufacture, only the best materials are used, and the most modern and efficient machinery employed. These things count "in the running" and ensure that extra comfort and reliability which make every trip a pleasure.

Clincher Tyres are made to maintain the sixty years' reputation of The North British Rubber Company—and they do so by giving the utmost service and fullest satisfaction. They are made at Castle Mills, Edinburgh — the Largest Rubber Factory in the Empire.



**Stockists Everywhere.**

THE NORTH BRITISH  
RUBBER CO., LTD.,  
Edinburgh, London, and Branches.



**The Training of a Despatch Rider.—**

through and a good many more come off, we push on again, and are soon on better roads and quickly approaching the rendezvous. As the roads improve the pace becomes faster, and here and there we see men stopped by the roadside, pumping up, or repairing punctures, or perhaps struggling with an exhaust valve cap which refuses to budge. It is not all beer and skittles running these training machines, which have been used over and over again by different recruits since the beginning of the war, or scrapped by one authority and rebuilt to provide recruits with experience. However, we arrive at the point of concentration, and our machines are again lined up in units, and we break away for about half an hour. Everyone has a tale to tell of his experiences on the run. Some have lost their way, others had this trouble and that, and many of the first-week men, quite new to the game, have not yet arrived. We watch them coming in one or two at a time. Look, who is that coming in with a roar like an aeroplane on a Duggy with low gear in? We go over to chip him about it, and find out that he is not aware of the existence of a change-speed gear box on his machine, and has run the whole way on low. Poor engine, what a gruelling it must have had, and doesn't it smell hot? After assuring him that he will pass up to second week all right if the sergeant sees his engine, we leave him to think it over, and drop into a little shop for a cup of tea.

Here again all is hurry and bustle. The poor woman is only used to serving one customer at a time, and with a shop full of the boys all asking for different things at once she is utterly bewildered. However, we get served in time, and shortly we fall in again and our unit is ordered to another place to open a signal office.

**Opening Office.**

We now begin to feel important. There are only eighteen of us and a sergeant, and we represent a corps. This seems real. We are on our own, and are expected to show our smartness by the rapidity with which we can open office and get into communication with other units. A few minutes' run and we are at our destination. We fix the signal service flag over the door of the inn we have chosen for our headquarters, our machines are lined up outside, and the more experienced members are chosen for the office work, and soon get busy with the messages that

we have opened office at such and such a time. We are eager that our opening message shall be timed earlier than the others, and we are soon busy carrying these messages to our divisions and to A.H.Q. For an hour or so we are busy carrying messages backwards and forwards on the same roads till we know every inch of the district and the natives are well aware that we have "arrived." One of our number is asked by a "civvy" what we are doing, and volunteers the information that the enemy are supposed to be attacking the Thames Valley, and we are the signals of an army advancing to meet them. This news quickly spreads round the countryside, and, getting somewhat distorted and exaggerated, we are presently asked if it is really true that the Germans have landed at Wapping and are coming up the river in barges!

We eat our rations as best we can between runs, which keep us going practically the whole time. We are fortunate in having all the rations, as if anyone is missing or delayed it is generally the man with the joint.

Ah! what is this? Operation orders to move and reopen office about six miles away by two o'clock. These orders have not been too quick in coming, and it is now 1.45, so we have to pack up hurriedly, and off we go to get our reopening messages off as promptly as possible.

**Marsh Gibbon.**

Next we are speculating as to the night position. The older hands look at their maps, and, working on the course of the scheme, suggest the possibilities of being sent to this place and that. However, when the message comes, "Marsh Gibbon," says the sergeant,

and the popularity of the place as a night office can be judged by the groans of those who have been there before. The route to this place we find very twisty and tricky, and we are now riding in the dark. Just as we are entering the village water looms up suddenly in front of us, and we are into it—a pond at the turn of the road—and, meeting some of the others, we find they have come a different way and entered the village by a different road, but they also have struck a pond in the dark. Now we know why it is called Marsh Gibbon. We report for duty and are given a run to a division, and, bearing in mind that we must find our way by the map alone and not stopping to look at signposts, we study the route thoroughly before starting, and, having memorised it, proceed to the cross roads, where we turn to the left.



Despatch riders studying maps whilst awaiting orders. Accurate map reading is an essential accomplishment of every D.R.



### The Training of a Despatch Rider.—

On approaching these cross roads there appears to be a sort of illuminated garden which for brilliance reminds one of the Palace Pier at Brighton. However, it simply turns out to be about a dozen of the boys shining their lamps on the signpost. On passing we notice that by the direction of this sign we have to go straight on, whereas we are turning to the left. Out come our maps, and arguments commence which end in our finding out that the signpost is loose in the ground and has been turned round by one of our officers to see if we are really as smart as we ought to be.

### A Car in Trouble.

Arriving back at the corps office rather late, we notice that a couple of officers have stopped with a car, and are busy apparently looking over our machines by candlelight, and on conveying this information to the others, who are now getting their blankets laid out for the night, one of the boys remarks quietly, "Oh, they are dissing our machines, are they? Where is their car?" and before we know what he really means he is out and changing over the h.t. leads on the car, working quickly in the dark, making 1 2 3 4 connect to plugs 4 3 2 1, so that the leads looked about the same, but would, of course, prevent the engine from starting. After about half an hour's shuffling round and playing the "Old Bull and Bush" through many times with the car handle, the officers called for our artificer, who, being in the know, did not find the trouble, and

eventually the officers decided to stay the night. Of course, next morning there was a general looking over of machines and many troubles to find, and eventually all were ready for the road, including the car. Breakfast over, we moved on, and by 9 a.m. were opening at a new position, this time about twenty miles on the road towards home, and we were soon busy again carrying despatches as before.

### "Some" Rider.

Looking at my docket after a run to A.H.Q., which was three miles away, I found that by docket time I had done the journey in three minutes. This made me think I was "some" rider, till I looked at the time for the return journey—fourteen minutes—when I decided it was evidently a case of "some" watches.

By 2 p.m. we were concentrated for the return journey to camp, and, all units coming together again, there was much to discuss. Why did the 18th Division take up their last position within the enemy's lines? Here comes So-and-so being towed. What is his trouble? Broken exhaust valve? Then he must have been blinding! And here is another with a seized engine—more material for courts of enquiry. And what about Bill, where is he? Oh, he will be here soon, he is afraid to go fast, as he thinks if his belt breaks his back wheel will drop out. The roll is called, all present reported, and off we go on the road home. Throttles are now opened a bit wider, as we know pay parade is the next item on the programme, and this is a very necessary ending to what has been a happy and memorable scheme. **GEORGIE.**

## A GREAT TRACK RIDE.

1,386½ Miles in Twenty-four Hours. Many Records Broken.

**I**N last week's issue there appeared, on page 89, a description, entitled "A Great Ride," of a Transcontinental trip by Alan T. Bedell, who rode from Los Angeles to New York on a four-cylinder Henderson, the distance—3,296 miles—being covered in 7 days 16 hours 16 minutes.

We now have to record a wonderful track ride, in which several track records held by Bedell were eclipsed. On this occasion Erwin G. Baker, riding a Powerplus Indian, beat Bedell's twenty-four hour track record of 1,153½ miles by covering in that time a total of 1,386½ miles (57.76 m.p.h.).

In the course of beating the twenty-four hour record, Baker incidentally broke the five hundred mile, the one thousand mile, and the twelve-hour records. He covered five hundred miles in 8 hours 38 minutes 30 seconds against the former record held by him of 9 hours 58 minutes. The thousand miles were covered in 17 hours 26 minutes 30 seconds, beating the previous record held by Bedell by 2 hours 34 minutes 12 seconds. In twelve hours Baker covered 702 miles, while Bedell had only 559 to his credit. In eighteen hours Baker covered 1,035 miles, as against 854 made by Bedell in his attempt.

The start was made promptly at 6 p.m. Tuesday, June 26th. Baker's schedule called for a stop every one hundred miles for petrol and oil, and the first 100 miles was rolled off in 96m., an average of 62½ m.p.h. This speed, not counting the stops, was kept consistently throughout the run. At every stop care-

ful inspections were made of the valves, springs, and oil feed, so that with a refill the time consumed was almost five minutes. The second 100 miles was drawing to a close when the record breaker's first trouble was experienced. His engine would miss for half a lap and then pick up its speed, but as it had only slowed him down to a little below sixty, he was signalled to complete the second century. When he stopped an examination of his petrol pipe showed where the trouble lay, and he was started off with a loss of 3m. 15s.

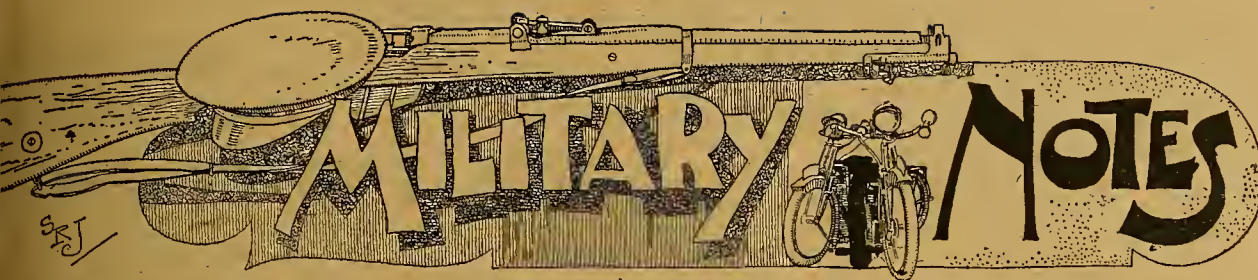
At 206 and 210 miles, stops for the same cause were again made necessary. The strainer was removed and the trouble eliminated. At 796 miles a collision with a rabbit almost broke Baker's right hand, and on his next stop his hand was swollen so badly that he could hardly get his glove off.

Just after the 900th mile had been passed, a heavy downpour of rain deluged the lone rider, and after a few minutes he was forced to stop, losing 11m.

At noon of the second day, eighteen hours after the start, 1,035 miles had been covered, and at the 1,236th mile the rider was signalled to sprint, and the lap was turned at the rate of 66m. per hour.

After the trial was over the motor was taken down in the presence of the referee and six disinterested parties, and when carefully measured was found to be under the measurements prescribed by the F.A.M. It was a stock Powerplus Indian, and an affidavit was secured to substantiate the claim.





### MAILS LOST AT SEA.

LETTER and parcel mails from Nigeria, Gold Coast Colony, and Gambia, containing correspondence and parcels posted during the second and third weeks of June approximately, and probably letter mails from other places on the West Coast of Africa, have been lost at sea through enemy action.

### PROTECTION FROM MUD.

A LORRY driver of the Motor Transport section with the Salonica Forces writes: "The article by 'East Coast' in *The Motor Cycle* interests me. The 'Tank Minor' monocoque is attractive, and I hope to possess a free-wheeler some day, and if such a free-wheeler as he suggests could be given us I feel sure it would become popular in a very short time. It seems to me that manufacturers either cannot or will not give us adequate shield from mud on motor cycles, so if we have a 'Tank Minor' monocoque, in which we can put our engines when we desire, there is certainly a good time coming for us motorists after the war, and that will not be long now."

### WAR SCRAP MOTOR CYCLES.

LAST week we suggested to the British Red Cross Society that better prices could possibly be obtained in France for war-worn motor cycles than in this country, since there is an abundance of motor cycles in the British Isles, whereas there is a real dearth of machines in France, so our correspondents advise us. Besides, there would be economy in the matter of carting and freight space. In replying, the Director of the Motor Ambulance Department of the British Red Cross Society advises us that the question of selling their scrap motor cycles in France has been considered, but, owing to the prohibitive duty, such a course is impracticable.

### THE TANK CORPS. ROYAL WARRANT ESTABLISHES A NEW ARMY UNIT.

THE Tank has come to stay, both the formidable war engine and the name the Army gave it when it first waddled out on the Somme, and glorified the Kaiser's soldiers. Hitherto it has been officially known as Machine Gun Corps (Heavy Branch), *The Motor Cycle* being instrumental in obtaining many thousands of recruits for this unit. An Army Order has now been issued giving particulars of a Royal Warrant authorising the formation of the Tank Corps.

The new unit of the British Army will consist of two parts—technical personnel and non-technical. The latter, both officers and rank and file, are to have the rates of pay and the conditions of service applicable to the Royal Field Artillery.

OFFICERS.—Majors, 19s. to 21s.; captain, 15s. 6d. to 17s. 6d.; lieutenant, 10s. 6d.; second lieutenant, 9s. 6d.

OTHER RANKS.—Mechanist staff sergeant-major, 6s.; staff sergeant, 5s. 3d.; technical quartermaster-sergeant, 5s. 3d.; tank mechanist sergeant, 4s. 2d. Tank mechanist, first class: Corporal, 4s.; lance-corporal, 3s.; private, 2s. 8d. Tank mechanist, second class: Corporal, 3s. 6d.; lance-corporal, 2s. 6d.; private, 2s. 2d.

Officers will be obtained by granted commissions to selected cadets from the Tank Corps Officer Cadet Battalion and from officers seconded or transferred from other units in the Army.

The following will be included in the technical section as tank mechanists, and will be graded as First or Second Class Mechanists, according to their technical efficiency.

Acetylene welders, blacksmiths, boiler-makers, copper-smiths, draughtsmen, electricians, fitters and turners, painters (camouflage), tank drivers, tractor drivers, and wheelers.

### MOTOR CYCLIST AIRMAN'S FUNERAL.

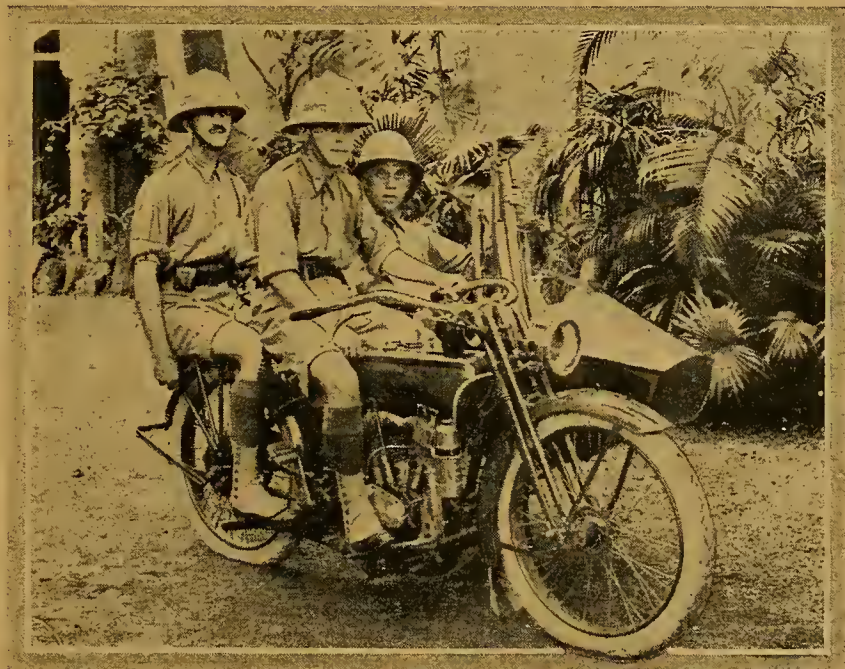
FLIGHT-LT. RONALD MORRISON, R.N., of Bickley, whose death was recorded in a recent issue, was buried on Tuesday, 17th July, at the little cemetery at Bromley Common, near the Sevenoaks Road. There were many floral tributes, one being from the aerodrome used by the deceased.

### ILLEGAL SALE OF WOUND STRIPES.

AT Old Street last week, before Mr. Wilberforce, Laura Alexander was fined £20 for selling a military cap badge, two wound stripes, and other such articles to unauthorised persons.

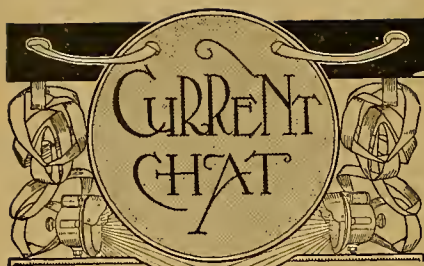
Captain Lowther, A.P.M., said that the sale of stripes and medal ribbons without authority had become a great nuisance. A lance-corporal and a civilian were sent to the defendant's shop in Great Eastern Street, and they purchased two wound stripes, a cap badge, and Queen Victoria and Albert medal ribbons. When he called at the shop the woman said that she did not know that she had done wrong.

The magistrate said that the distribution of these things must be stopped. The maximum penalty was £100.



Members of the Calcutta Scottish going to parade in Calcutta, India. This is now a daily event, and a number of Harleys are every day lined up near the parade ground.





## SPECIAL FEATURE

THE TRAINING OF A DESPATCH RIDER.  
SIDECAR REFINEMENTS. HEAT IN MOTOR CYCLE ENGINES.

## TIME TO LIGHT LAMPS

SUMMER TIME.

Aug. 2nd	...	...	9.16 p.m.
" 4th	...	...	9.12 "
" 6th	...	...	9.9 "
" 8th	...	...	9.7 "

## The Hastings Road.

Considering the traffic the Hastings Road is in excellent trim, although loose between Sevenoaks and Tonbridge, Riverhill being bad. From Battle, the alternate road *via* Arrow Hill is best.

## A Meet of 1,400 Motor Cyclists.

Over 1,400 motor cyclists and 5,000 spectators met at Beacon, N.Y., recently at a hill-climb. Indians, Harley-Davidsons, and Hendersons figured chiefly as the prizewinners.

## The "Un-English" Trap.

Recently a Bath magistrate, on the occasion of three restaurant proprietors being fined for exceeding the fifteenpence per meal limit, remarked, "Setting traps to catch offenders is not English. I would rather not get evidence at all than adopt such a system." Let us hope that other magistrates will make similar remarks against the "un-English" speed limit trap.

## Triumph Depot Smash.

On Wednesday a heavy motor lorry dashed on the pavement of High Road, Lee, and completely demolished the shop front of the T. J. Ross Triumph depôt. Four plate glass windows and frames, and four motor cycles, including a Triumph and Douglas, were smashed. The damage is estimated at £100. Ross thought it was another bomb! A new Matchless and Harley escaped injury.

## Short-period Licences.

The writer of the leading article in *The Autocar* of July 28th touched upon a topic of peculiar interest to hundreds of motor cyclists in khaki and also civilians. The subject was "Short-period Licences." Although we have many times suggested that men home on leave for a short period only should be permitted to use their motor cycles free of taxation, our sister journal has gone further and approached the Treasury with a view to obtaining this concession. Should this scheme be impracticable, an alternative suggestion would be the issue of short-period licences to cover a week, a fortnight, or a month. To carry this idea still further, why not one-day special permits, to enable an owner who may have laid up his motor cycle, but who wishes to give a prospective purchaser a trial run, to do so without breaking the law?

## The Motor Cycle in Australia.

The motor traders of Australia, in a protest against the proposed embargo on imports, stated that "The motor cycle in particular helps to keep the farmer's son on the land, besides enabling him to keep in touch with the markets."

## That Irresistible Hooter!

It is surprising how great is the fascination in the act of blowing a motor horn—not only in the small boy element, but often in his elders. A few days ago we noticed a column of recruits returning from a route march as they passed a motor cycle at the roadside. The bulb of the horn protruded at an inviting angle, and every other man within reach made a grab at it, with the result that the piercing toot-toot marked time with their martial tread till the whole column had passed.

The incident afforded an amusing character study for the onlooker. One could tell by the expression on the face of each man as he drew near whether or not he intended indulging in this perilous frivolity. Some looked away with bored indifference, obviously considering the act beneath them. Others hesitated and were lost, but the boyish spirit, who spotted the horn from afar and approached it with a mischievous twinkle in his eye, was well represented. In the meantime the horn wasted as much breath as would suffice for a fortnight's ordinary use.



Gnr. A. F. Jakins, of the "Tanks," winner of the 24 h.p. Triumph in the draw organised by the Newcastle-under-Lyme British Red Cross Society. Jakins has been wounded in action, and is now in a London hospital recovering from nervous breakdown and deafness.

## Putting on the Screw.

The Board of Trade Order issue July 13th, 1917, now compels all dealers in petrol to supply to the Board, through the Petrol Control Department, particulars as to purchases, sales, deliveries, appropriations, and stock-in-hand of motor spirit in such form and at such intervals as may be required. We understand that inspectors will visit the various dealers at intervals and examine the books recording all sales of petrol.

## Overseas News.

At a recent meeting of the general committee of the Pioneer Motor Cyclist Club, Christchurch, N.Z., it was stated that a special committee which had been appointed to peruse the rules of the Auto Cycle Union had met and had found therein nothing contrary to the interest of members of the Pioneer Club. The committee, therefore, were unanimous in recommending that the Pioneer Club should be linked up with the Auto Cycle Union in England.

## Motoring after the War.

Mr. Joynson-Hicks, at the annual meeting of the Automobile Association in London recently, referred to the prospects of motoring after the war. Many facturers must realise the enormous possibilities which the present conflict has shown them. He predicted a great development of the motor engine; it would in the future be far more wonderful than that of to-day. One question about which motorists would have much to say after the war was the condition of the roads. It was essential for the travelling and commercial community the existing roads which have been cut up by war lorries should be made good and new ones constructed.

## Air Climbing.

In a daily paper we read the following words: "From the very ground up quick climber is a joy . . . a little run and then a clean sweep away. Regardless of all the precepts of experience, you can turn as sharp as you climb, and turn and climb again." The motor cyclist who reads these words will at once think of a powerful motor cycle is referred to. The writer also says that: "To be 20,000 feet up with a powerful engine and a well-rigged machine is to feel a sense of power that nothing else can give." We have had no experience of flying, but we should think that the joys of a powerful fast-climbing motor cycle on a good sporting hill must come very near to the sensations felt by the pilot of a fast climbing aeroplane. Speed uphill is one of the chief joys of motor cycle riding. A machine which does not give that sense of power on heavy gradients is not, in the opinion of the average motor cyclist, worth having.



# The National War Relief Funds.

At the week-end the principal relief funds stood as follow:

The National Relief Fund (distributed £3,641,622)	£6,214,733	0	0
British Red Cross Fund	7,113,343	19	5
Tobacco Fund	134,465	0	0

# Two-stroke Lubrication Again.

Two-strokeists, whose engines are not dependent on the petrol system, should bear in mind that gummed-up piston rings not only upset the running, but that it may cause actual harm to the engine to continue running it for long periods after the rings are gummed in their grooves. This is because the leakage past the rings prevents the oil gaining the top of the piston, which, consequently, runs dry, till finally the top ring becomes literally welded in its groove.

# A Stolen Motor Cycle.

A correspondent, Mr. J. E. D'Eath, 7, Dyers Lane, Putney, London, S.W., recently advertised his motor cycle in his journal. Two men called in answer to the advertisement, gave him a cheque, which ultimately proved to be worthless, and left an address which was found to be false. The following is a description of the machine: 1914 two-stroke two-speed Clyno; engine number L230, Lucas lamps and horn, trip cyclometer, pillion seat; front tyre, Michelin 26in. x 2 1/2in.; back tyre, Hutchinson 26in. x 2in.; and dust cap missing on one side of back hub. Our correspondent gives a description of the purchaser as follows: Age about 24, height about 5ft. 7in., and has crooked nose.

# Economy in Petrol. Warning to Licence Holders by the Controller.

The Petrol Controller (Sir Evan Jones) on Monday issued the following notice with reference to the withdrawal of out-of-date motor spirit licences issued in respect of private motor cars and motor cycles:

Full duty motor spirit licences of the current series are available for private motor cars during the period May to October inclusive, and for private motor cycles during the period April to September inclusive.

Full duty licences which were issued for any prior period are hereby cancelled, and the holders of such licences are required to return them at once, whether exhausted or not, to the Petrol Control Department, 19, Berkeley Street, London, W.1.

The licence duty paid on any unpurchased portion of the quantity of motor spirit licensed will be refunded on the receipt of the licence by the Petrol Control Department.

In view of the necessity for conserving supplies of petrol to meet the necessary requirements for the essential trade and industry of the country, holders of licences are advised to exercise the utmost economy in the consumption of petrol, and to limit the use of motor vehicles strictly to purposes of absolute necessity. The attention of licence-holders is called to the fact that licences are not issued for purely private or pleasure purposes, and their use for such purposes, if brought to the notice of the Petrol Controller, may lead to their cancellation.

# Recent Appointments.

Mr. W. E. Bullock, works manager, and Mr. D. J. Parker, secretary, have been appointed directors of Singer and Co., Ltd.

# Death of a Prominent Motor Cyclist Airman.

It is with very great regret that we have to record the death of Lt. Ivan B. Hart-Davies, R.F.C., of Rugby, who was killed while flying in England last week. He was best known to motor cyclists as the holder of the John-o'-Groat's to Land's End record, the figures for which were reduced by him on more than one occasion. He also competed in the Senior Tourist Trophy Race of 1912. In June, 1913, he established an End-to-end record for a light car, choosing a Singer light car for the performance.

In all his motor cycle rides he remained faithful to the Triumph, and as an evidence of his popularity it was astonishing to see the number of friends and acquaintances who used to turn out to assist him in his record rides. Hart-Davies was a fine tall specimen of a



Lieut. I. B. Hart-Davies, R.F.C., killed last week whilst flying. Davies will be remembered by thousands of motor cyclists as an ardent enthusiast of the sport, and holder of many long-distance records.

motor cyclist, weighing, at the time of his rides, over thirteen stone, so that his records are all the more meritorious, being accomplished by aid of a wonderful vitality combined with a determination to wrest the coveted record from all comers.

To read of these performances, one would possibly imagine that he had little time to spare for other pastimes. On the contrary, however, he was an all-round athlete, a good cricketer, Rugby footballer, enthusiastic hockey player, and Scoutmaster of the Rugby patrol of boy scouts.

He was a thorough sportsman in every sense of the word, and of the very best type. His loss in motor cycling circles will be very keenly felt.

He was in his thirty-ninth year, and obtained his "wings" in August last year, being doubtless one of the oldest pilots to obtain their "wings" during the war.

The funeral took place at Southam on Tuesday last, a place where the early life of the deceased was spent, his father having been the rector of that place for many years.

# New Identification Marks.

The County of London has at present fifteen identification marks—A, LA, LB, LC, LD, LE, LF, LH, LK, LL, LM, LN, LO, LP, and LR. To these the identification mark LT has now been added. Kent, of which the identification mark was first D, then KT, has now had KN added to it.

# Quite a Curio.

There is no doubt that a certain percentage of letters from Overseas readers are not coming to hand, and one we have just received from the Gold Coast bears signs of having been immersed in water for some time. The letter contained photographs, glutinous and damp, and the envelope bears certain strange words and signs we are unable to decipher.

# The A.A. and M.U. General Meeting.

On Wednesday, the 25th ult., the annual general meeting of the Automobile Association and Motor Union was held at the Savoy Hotel, Mr. Joynson-Hicks, M.P., taking the chair.

In the course of his speech, in moving the adoption of the report, Mr. Joynson-Hicks gave some interesting figures, which had been given to him in Parliament, relating to the petrol position. With regard to petrol supplies, he pointed out that motorists had been reduced from sixteen to ten gallons per month, and from ten gallons to no gallons per month, unless they were doing war work. There was ample petrol in the world, and there would be no shortage after the war. The Shell Co. had 18,000,000 gallons of petrol stored, waiting for distribution after the war. He hoped motorists would realise that petrol prices would go down after the return of peace.

Mr. Joynson-Hicks quoted figures showing that during the first five months of the present year over 57,000,000 gallons of petrol had been imported, as against approximately 49,000,000 gallons in the corresponding period of last year.

The Chairman spoke of his confidence in the assured future of the Union, and pointed out that when peace conditions returned there would be much to be done. It was interesting to note that, in spite of the various restrictions on motoring, no less than 4,000 new members had been enrolled during the third year of this gigantic war.

Mr. Chas. MacWhirter (chairman of the Finance Committee) drew attention to the fact that the only additional item was £10,645, which had been devoted to the maintenance of those members of the staff who had volunteered in the days when we had a volunteer army. On the subscription side the Union had received £75,000. Another item he would mention was the reserve fund, which now amounted to £96,000.

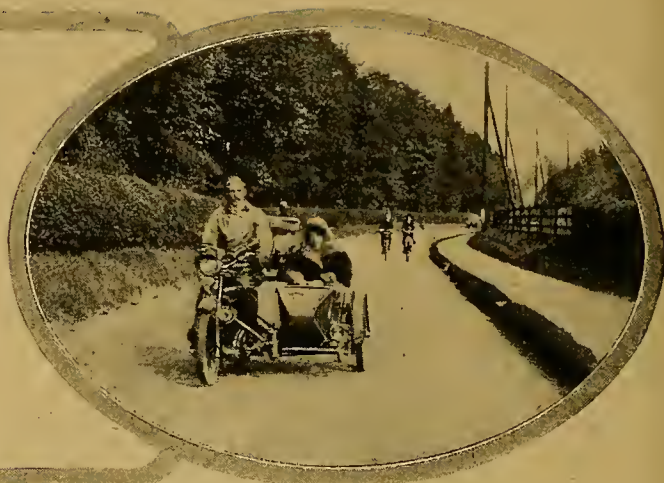
# Petrol for France.

The chairman of the A.A. and M.U. stated at the above meeting that he had learned that petrol for use of the Army in France is now sent direct to that country, and, in view of this fact, he said that it would be instructive to know how the extra amount of motor spirit imported this year had been distributed, for certainly it had not been used by private motorists.



# The £100 SIDE CAR OUTFIT

*By an Officer*



**A**LL art is a compromise, whether it be the writing of a play, the creation of a statue, or the building of a motor vehicle. The best for the many must be necessarily the manufacturer's motto, and those who abuse that individual should try and bear in mind that it is just possible he knows his business, and in providing the much discussed and often scoffed at combination *de luxe* he is not doing so because he likes looking at it, or even riding in it, but because he is firmly of opinion that he can sell it. And in my opinion this provides evidence of sanity both on the part of maker and user.

## The Cheap Car.

Why this agitation *re* cheap car or expensive sidecar *de luxe*? Remember that the price under discussion is invariably £100 to £130. For that figure there is only one single car with a shred of reputation to be bought new. It is so well known that the Ford is the only machine in this class among cars that I shall not be accused of giving it a free advt. by naming it. Now, if there is one machine in the world that is everything that does not appeal to the average motor cyclist it is the Ford. Lest I should be thought to be disparaging that remarkable machine I will disarm criticism by saying I have driven one some thousands of miles, and, roughly speaking, put it in the same category as the Rolls-Royce and the larger sporting *type course* Peugeot as among the very few cars really worth the price asked for them. But can any sane and sound rider who has ever been on a first class well-tuned motor cycle find pleasure in plugging along at twenty-five miles an hour on a chug-chug Ford? It is all right for the man with a big family and moderate means, or as a tender to faster and bigger cars, or as a tradesman's delivery van (its real province in my opinion), but, as a serious touring machine, it is not to be compared with an up-to-date 8 h.p. sidecar *de luxe*. Its one pull is luggage carrying capacity: but the limitations of a sidecar are not half so serious as some might think, and a well-equipped outfit can easily carry sufficient baggage for two people for a week. If more is wanted send it on by train (I am writing with an eye on normal times).

It must not be assumed, however, that the 8 h.p. *de luxe* sidecar outfit is perfect. Far from it, but it

will get rapidly better and better after the war, and the competition of the cheap car will do the sidecar a lot of good. The weak spot in the outfit at the present time is the necessity for the driver to wear special clothing. This is a genuine nuisance in every way, and all enterprising makers should strive and strain every nerve to obviate this nuisance. We are only on the fringe of the really weatherproof motor cycle, I believe, and if water-cooling becomes more and more general on high-powered machines designed to pull heavy sidecars, as I believe it will, there is nothing to prevent almost complete protection of the driver from wind, mud, and rain, at all events up to his waist. I know many people will refuse to go with me in the argument for water-cooling, but I am convinced it will come, and some considerable experience with the very best air-cooled aeroplane engines has confirmed me strongly in this opinion. The plain matter of fact position is that air-cooling is a makeshift. It is advisable for certain reasons on aeroplanes—but the reasons have no hold when the engine is on a motor cycle.

## Unnecessary Noise.

Another serious criticism of the powerful motor bicycle and sidecar is the noise of the exhaust. It is possible to render the engines of these mounts as silent as on a small car, and no one is to blame but the buyer if he take delivery of a noisy machine. Other weak spots, such as draughtiness of the sidecar, tyre troubles, and such like, can easily be overcome by a little forethought in drawing up the specification of the complete machine before purchase. And, believe me, it is worth while to take some thought over the equipment of an outfit costing anything up to £130 initial outlay.

## Advantages of the First-class Sidecar Outfit.

It is when one has experienced both types of vehicle under discussion that one sees the good points of an outfit *de luxe*. The cheapness of operation, the negligible annual tax, not one per cent. on the capital outlay, the small petrol and oil bill and very moderate tyre bill (if suitably large tyres are fitted, say 650 x 65 mm.), and the high average speed obtainable all render a first-class outfit a joy to the owner. In any but the vilest weather it has the slow *cheap* car whacked all ends up, as the saying goes. We are



**The £100 Sidecar Outfit.—**

rapidly coming to the time when an outfit can be hosed down, thus robbing cleaning of all its horrors. Waterproof bearings, disc wheels, all black finish, waterproof magnetos, are with us now. In a few years we shall see no more nickel plate. Detachable wheels will be so quickly and easily detached that no one will think of leaving the machine on its wheels when cleaning. Simply jack it up and hose out the insides of the mudguards. With a well-designed, water-cooled twin—or dare I say four-cylinder *monobloc*—engine, there is no excuse for not affording complete protection to the power unit. I believe that we are only just on the fringe of the really perfect sidecar outfit. If anyone asked me what sort of sidecar would survive I should say the highest class and the highest class only. The cheap sidecar is horrid.

I have little faith in the double purpose outfit, solo or dual at will. One is continually hearing this ease of detachability urged as one of the virtues of a sidecar. I don't agree. A man very seldom detaches the sidecar—it is not nearly so easy as it sounds. A combination should be a combination—all the time. Whether the frames of machine and sidecar will eventually be one unit remains to be seen. Probably not, owing to the increase in difficulty and cost in carriage by train when desired. But we must take off our hats to the cheap car, because it has served to show the excellence of the *de luxe* outfits in the past by comparison, and it will by competition of, probably, the fiercest kind in the future, incite the manufacturer of the British sidecar *de luxe* to produce yet more perfect machines—especially in the way of cleanliness and silence.

## BENZOLE AS A MOTOR FUEL.

### AN IMPROVED PRODUCT TO BE EXPECTED AFTER THE WAR.

**W**HEN benzole is proposed as a fuel for internal combustion engines the natural inclination is to compare its properties with petrol. A comparison by the analyses of the two fuels, although only giving a theoretical comparison, will be interesting and possibly convincing to the uninitiated who oppose benzole as a fuel.

The following analyses are of commercial benzole and of the highest grades of petrol at present obtainable by the public.

SPECIFIC GRAVITY AS COMPARED WITH WATER 1.000 AT 60° F.					
Petrol	...	...	...	...	0.719
Benzole	...	...	...	...	0.881

#### DISTILLATION TEST IN DURTZ FLASK CONNECTED TO 18IN. LIEBIG CONDENSER.

Petrol.	Benzole.
Boiling point, 62° C.	Boiling point, 76° C.
Percentage at 90° C. = 30	Percentage at 80° C. = 23
" " 100° C. = 53	" " 90° C. = 90
" " 110° C. = 71	" " 100° C. = 95
" " 120° C. = 82	" Dry at 114° C.
" " 130° C. = 90	
" " 140° C. = 93	
" Dry at 148° C.	

The flash point of each fuel is well below 50° Fahr., but no reliable figures can be given owing to the fact that samples of each vary considerably in this respect.

The analyses given, let us examine the merits of each fuel.

The specific gravity of the petrol is lower than that of benzole. This, however, can have no effect on the running of an engine.

The distillation shows by the longer distilling range of the petrol that we have in benzole a far more homogeneous mixture. This is due to the fact that all definite compounds have a fixed boiling point, and the bulk of benzole is composed of the pure compound benzene which has a boiling point of 80° C.

The distillation also shows by the percentages given at various temperatures that 30% of the bulk of petrol distils above the temperature at which all the benzole has been vaporised. Consequently 30% of the petrol is less volatile than the benzole, and thus less easily carburetted.

To prove this point, that benzole is vaporised more easily than petrol, the following experiment was made: Ten cubic feet of coal gas was passed through a measuring meter into a small measured volume of benzole. 62% of the benzole was vaporised and carried away by the gas. Now the same process, under identical conditions, was carried out with petrol. Only 54% of the bulk was vaporised.

Coming now to practical experience with benzole it gives—

1. Absence of knocking.
2. More mileage.
3. Greater power.

The former disadvantages in the use of benzole are probably now eliminated owing to the experience gained by the many firms in their huge output for explosives. They were the absence of a system of general distribution and the presence of injurious sulphur compounds—Thiophene, carbon-di-sulphide, etc. The former will be wiped out after benzole-producing firms are released from munition work, and the latter was only found in isolated cases where the producing firm had little experience in the manufacture.

I have heard complaints made of benzole obtained from dubious sources, but not one where the source was an experienced firm.

Damage to the interior of the tank can occur only when benzole is used which has not been sufficiently treated with caustic soda after the acid washing, or when sufficient acid has not been used to extract the sulphur compounds.

The thickening of the lubricating oil is probably due to the presence of coumarone, which compound is also eliminated in thorough washing.

From the foregoing the reader must agree that benzole compares extremely well with petrol. I base my assertion on the fact that before the war many firms had little experience in the production of benzole, but now, when the Government accept nothing but the finest quality of benzole and advise on its production, they are capable of producing a clean, non-acid product.

L.A.S.



# THE DOUBLE-ACTING FOUR-STROKE.

A FOUR-VALVE ENGINE OF NOVEL DESIGN.

THE problem of obtaining more power for a given capacity has attracted every engine designer, and it is not a new departure to aim at a double action in a single-cylinder engine. To give an impulse on every down stroke, as in a two-stroke cycle, but to retain the advantages of quick and complete scavenging by ordinary four-stroke methods, is a difficult matter. The attempt is generally made with the object of obtaining in one cylinder the even torque of the flat twin. But there are many problems to solve, not the least being the troublesome question of dispelling the increased heat from the piston, for a piston under double firing action necessarily must be subjected to greater heat than the ordinary type. The risks of warped pistons, hot side, loss of piston ring temper, and seizure are all increased. Internal cooling is still in its infancy, but development in that direction may help to make the double-acting four-stroke an efficient power unit.

A new designer has commenced work on the problem, and his first engine is well on the way to its experimental stages. Mr. Leonard Hinks, director of James Hinks and Son, Ltd., of Birmingham—a firm not hitherto intimately connected with the motor cycle trade—is producing the engine we illustrate.

## A Double Piston.

There are two separate compression spaces: one in the head of the cylinder follows usual practice, the other is a little below it surrounding the piston. The firing in the top space acts direct on the piston head (the down stroke giving suction in the second space), the return stroke producing compression in the second

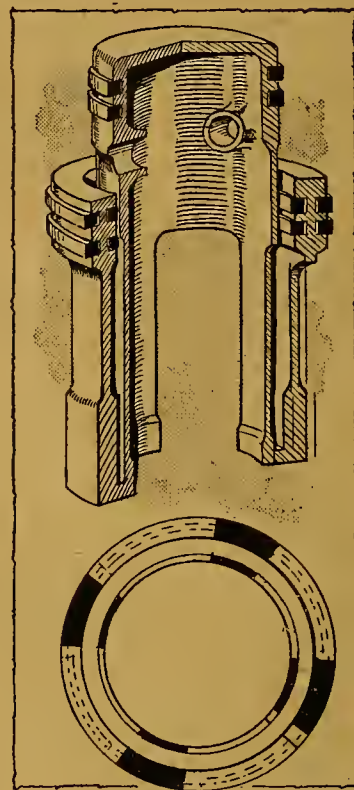
space (and exhausts the first space); firing in the second space acts upon the outer ring of the piston (the consequent down stroke is the suction stroke of the first space), and the return stroke exhausts the second space (and compresses the first space), thus completing a double cycle of operations in four strokes of the piston.

The peculiar shape of the piston should be noted; a small bore central piston is surrounded by and in one with a second piston, forming, in effect, a stepped piston. Six rings are necessary, the two internal ones being contractile. The area of the "step" is the same as that of the piston head, and the compression ratios are identical.

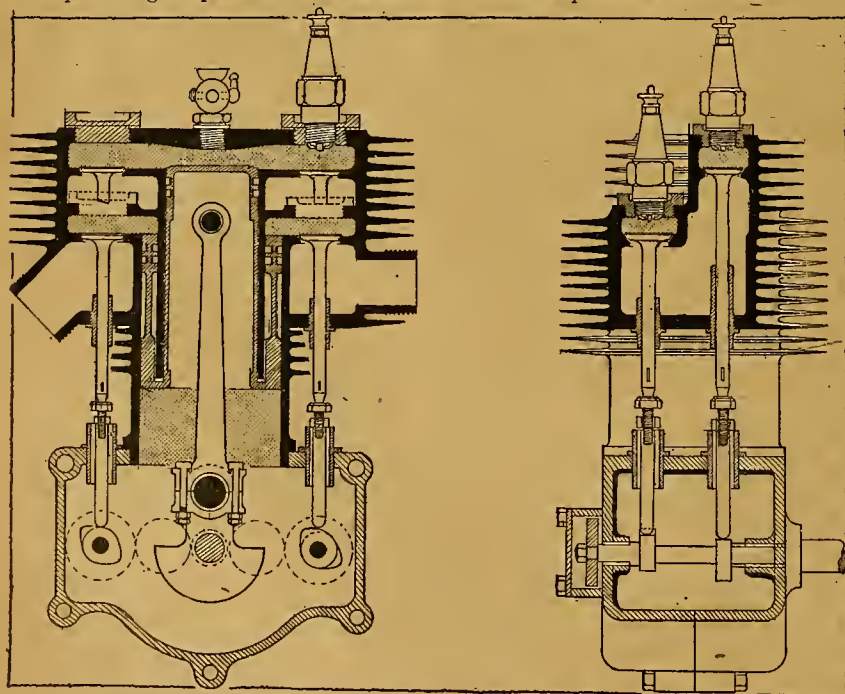
The valves are offset on either side, each pair opening into one pocket. The cams are operated by shafts on either side, driven by a train of wheels from a solid main shaft. There is no striking departure in valve construction, the standard J.A.P. type being taken as a model.

## Lubrication Difficulties.

As we mentioned previously, overheating is the chief trouble to be contended with, and we shall not be surprised if the designer finds difficulty with the central cylinder wall, i.e., that which is inserted between the two parts of the piston. Although the webs are slotted out to a considerable extent, the heat to be dissipated from the piston through this central wall to the external fins will be very great; efficient lubrication, which will be all the more necessary, will be also more difficult. The fitting up of the cylinder over the six piston rings will require no small amount of skill. Still, the proof of the engine is in its testing, and we shall await developments with interest. If it



A small central piston is surrounded by one of a larger bore, and forms a complete unit.



A double-acting four-stroke engine designed by Mr. Leonard Hinks, of Birmingham.

turns out to be a successful proposition its manufacture can be undertaken in large quantities by the designer, who is to be congratulated for tackling a very tricky problem.

## THE WARWICKSHIRE MOTOR VOLUNTEER CORPS

COL. D. F. LEWIS, County Commandant of the Warwickshire Volunteer Regiment, has authorised the formation of a County Motor Volunteer Corps. Light cars and motor cycles (with or without sidecars) are required. The duty of the Motor Volunteers is to provide regimental transport.

Infantry drill is not necessary, but occasional meetings are held to discuss plans and to receive suggestions. A special Active Section has been organised in Birmingham for men to receive training in such subjects as map reading, field sketching, reconnaissance, despatch carrying, convoy, etc., with a view to qualifying them to fill positions as non-commissioned officers.

Petrol is provided for the corps if called up and for training purposes, and special arrangements are being made by the Priority Branch of the Ministry of Munitions for the repair of vehicles belonging to members of the Motor Volunteer Corps.

The headquarters of this corps are in Thorp Street, Birmingham.



## A TWO-STROKE EXPERIENCE.

Four Thousand Miles Satisfactory Use by a Business Man.

THE modern two-stroke motor cycle (the production of 1915, for there has been little development since) is a curious little machine in the eyes of many motor cyclists. One hears such expressions of opinion as "Noisy little petrol wasters! I've no use for them; give me a decent four-stroke any day," or, "Not so bad, perhaps, as a runabout, but no use for serious work," and so on. This is usually the result of a short experimental run on a badly-tuned machine.

In 1914-15 my business as a surveyor necessitated almost daily visits to various properties in the vicinity of a large provincial town, and I decided to make use of a motor cycle again, my previous experience having been gained some years ago, but of later years I had been more interested in cars. I had no particular preference, and just purchased the first taking model I came across, which happened to be a  $2\frac{1}{4}$  h.p. two-speed Ivy.

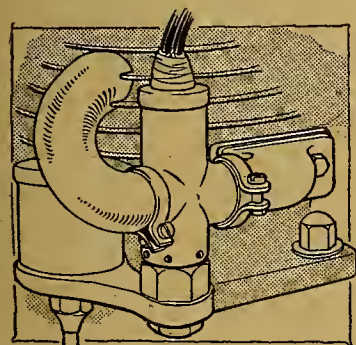
My first concern was petrol economy. The first gallon gave me about eighty miles, but after careful adjustments of float-level and jet (Amac carburetter), and fitting a hot air intake, the consumption was reduced to over 100 m.p.g. This must have improved considerably as the engine became run in, for the average for the whole distance of about 4,000 miles was 106 m.p.g. Lubrication by drip feed gave satisfactory results, and the oil consumption worked out at 1,320 miles per gallon.

Tyre wear was inconsiderable, the back being good for another 2,000 or more when I sold the machine with 4,000 miles to its credit.

The original Dunlop belt was used throughout without breakage and only being shortened once.

### Carbon Deposit.

The engine was taken down three times—at 800 miles, at 1,800 miles, and



Hot air intake fixed to Amac carburetter.

at 3,500 miles; only on the last occasion was decarbonisation really necessary; the top ring was stuck up (there are two rings pegged into one slot at the top and one bottom ring); it had to be broken out and a new one fitted, but the amount of carbon on the piston

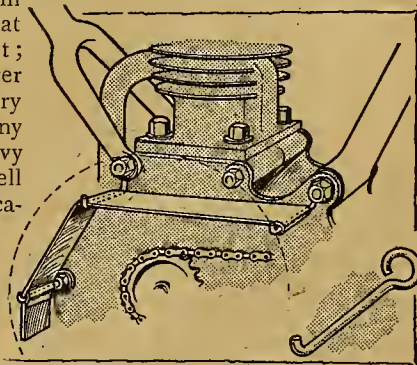
head was very small. The principal deposit was around the exhaust port, and on that side of the piston head and top ring.

The only renewals during the period were a release valve (a very unusual fault), one piston ring, and a cover plate on the Albion gear box (accidentally cracked).

### Speed and Hill-climbing Capabilities

My runs were principally in town and suburban traffic, stopping and re-starting many times in a day—a fact which makes the petrol consumption even more satisfactory—and yet speed was not sacrificed. Its limit was just over 35 m.p.h., but it was not really comfortable above 30 m.p.h. My usual running speed was twenty-five and over, and a day's average would work out at about twenty to twenty-two; on a few longer runs 100 miles were covered in just over four hours: once a non-stop seventy miles was covered in  $2\frac{3}{4}$  hours.

Not unusual speeds, but a very useful average. At hill-climbing its powers were very fair. I will not pretend that it would "fairly eat up a 1 in 6 gradient"; the second speed was generally required for anything steeper than 1 in 9, but I did not find a hill it could not take on second speed, and the West Country is notoriously hilly. The stiffest climb I recollect was a hill frequently included in local club contests; commencing at 1 in 12 or 15 for half a mile, then 1 in 10 to 1 in 6 at steepest part; total length, over one mile—a very fair pull for any machine. The Ivy took it quite well on several occasions, and did not get excessively hot. Rough weather conditions gave no trouble. I recollect dodging about in narrow, dirty



Leather shield carried on stout wire supports to keep mud off chain.

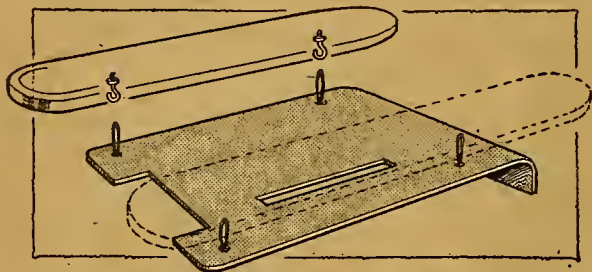
Somerset lanes and field tracks for three hours in torrents of rain without an involuntary stop—in fact, the machine never ran better. Another good point was its steadiness in grease: I cannot remember a skid of any sort.



## A Two-stroke Experience.—

## Interesting Additions.

Several gadgets which I fitted up may interest other riders. The hot air intake I have already mentioned. I soon found that the driving chain needed protection from mud thrown back from the front wheel. I fixed a leather strap, 1½ in. wide, on three stout wire brackets



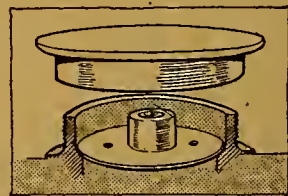
Undershield made from linoleum slung to hooks on the underside of footboards.

clipped under the engine cradle nuts. This answered well, being easily pulled off the supports, washed down, and replaced.

I was much puzzled to find out how mud got on to the belt; experiments with back mudguard flaps and side wings had no effect, but the fitting of an undershield cured the trouble—the mud coming from the front wheel reached the belt at the underside of the countershaft pulley. This undershield was made of a piece of stout oilcloth, slotted to fit around the fly-wheel and silencer, slung by wire loops to four brass hooks on the underside of the footboards.

I had a certain amount of trouble owing to petrol slopping out of the filler cap; this was prevented by cutting a tin disc to fit on the ledge inside the filler hole, and riveting a cork in the centre, just high enough to engage with the cap when it is screwed home. Two small holes drilled on either side of the cork gave the necessary air vent.

I experimented with plugs for some time. An ordinary Sphinx gave very fair results, but the most satisfactory running was done on a Simms plug with one of the side points removed and the central electrode cut down by an ½ in. A Sphinx with the side point removed and the central electrode flattened and bent over gave excellent running at high speeds, but was rather irregular at slow speeds, for what reason I could not determine. The engine absolutely refused to two-stroke on some plugs which were quite good in other engines.



A tin disc and a cork were fitted in the filler to prevent petrol waste.

I had no sign whatever of the notorious two-stroke rattle. I must confess that I never cured its four-stroking propensities at speeds below 11 or 12 m.p.h. on the level when the engine was practically "running light." Generally I was quite satisfied with this little machine, and I believe it is still doing good work. The Ivy proved a most satisfactory machine, but I consider that similarly good results can be obtained with any reputable make.

SURVEYOR.

## FLAT TWINS. "Ixon" and a Critic.

SINCE "Ixon" has replied to a criticism which was never published, I think I am justified in begging an extension of your courtesy for a little space in which to give your readers an idea of that which led to his article.

I originally congratulated you upon an editorial which contained a well-balanced judgment of the flat twin as compared with other engines, hailing it with relief after those exaggerations now admitted by "Ixon" in his *Apologia pro sua vita* dated July 19th, 1917.

Granting the pre-war popularity of the 350 c.c. flat twin, I take it that everyone is talking of the big ones to come afterwards. I maintained that since this is only talk, in so far as the majority of riders is concerned, there will be much disappointment if the reality does not fulfil expectations. ("Ixon's" egotism is superb when he considers that this would merely result in his own discomfiture—the most disastrous consequence would be that the development of the type would be hampered by public ridicule for years.)

There is only one large flat twin used on military motor cycles, and it does not give quite the same satisfaction as the 350 c.c. class.

I also enquired if "Ixon's" claims for the large flat twin were not based largely upon reports of engines used for stationary work in the various Services, and pointed out that since motor cycle engines do not run at a constant speed under constant load it is not safe

to conclude that units satisfactory under one set of conditions will be equally so under another set.

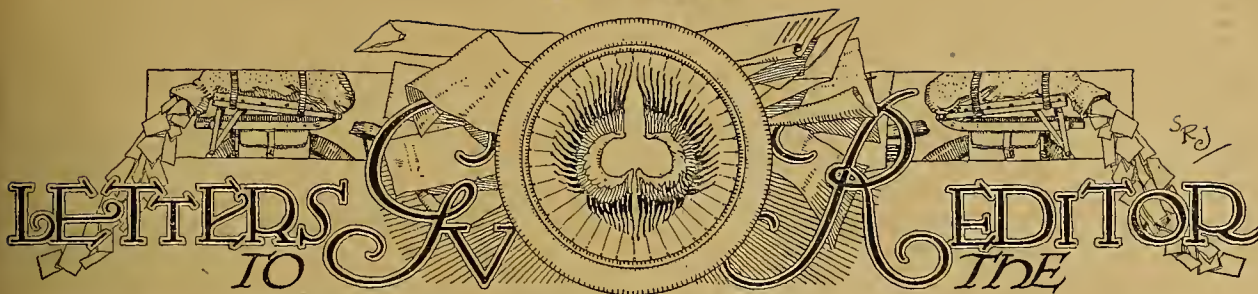
The faults to which I referred are based entirely upon an experience of over 1,000 motor cycles actually examined, and as the defects have been noticed to recur too frequently to be accidental they have been taken as peculiar to the type. Referring to p. 66 I ascribe (1) wholly and (2) partly to excessive r.p.m., and (2) partly and (3) and (4) entirely to the unbalanced couple in existing flat twin engines. That to which I mostly object in "Ixon's" article is the insinuation that I am a dour individual "with no sense of humour"—may I assure him that he is quite wrong?

For instance, I was intensely amused to notice that the week following my original letter "Ixon's" weekly comments were excused owing to his vacation at the seaside—it reminded me of those curiously convenient indispositions of Ministers of State in times of crisis, and although in venturing to cross swords with such an experienced journalist I only wished to prevent the damning of the flat twin by over-praise.

Having set out to cause him "furiously to think" I was compelled to abuse "Ixon" in a somewhat extravagant manner, but "may I disarm a certain amount of criticism by drawing attention to the value of exaggeration?"

I will subscribe myself as that "meticulously-minded reader in the A.S.C.M.T." WHARFEDALE.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### UNIT CONSTRUCTION.

Sir,—In your issue of July 26th you publish interesting designs of engine and gear box units. At the moment I do not know the date of their origin. Two in particular, however, attract my attention, for the following reasons:

Over ten years ago I designed a combined unit, the camshaft of which acted also as a direct magneto drive and second speed; further, the gear wheels were always in mesh, and engagement obtained by balls in a hollow shaft being pressed into spherical sockets or grooves in the gear wheels.

I might mention that this model (complete) I took to the Premier Co., Coventry, and, at their request, left it there for examination. In due course it was returned. It seems strange that the next I hear about this is when I see it in your valued paper, and it appears that the gear operation was either stale or worthy of some degree of imitation. I, however, claim to be the original inventor.

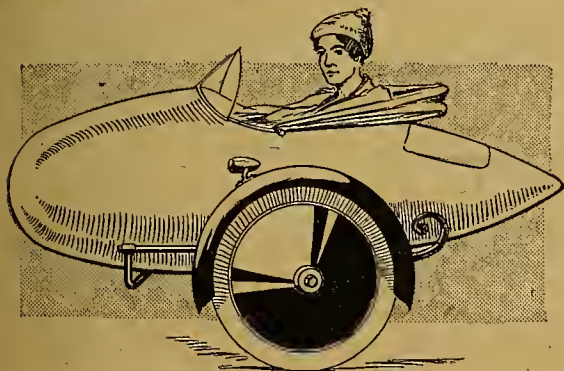
I might add that this method is in use with success in machine shops, etc.

C. ADAMS.

#### SIDECAR CONSTRUCTION.

Sir,—I saw in *The Motor Cycle* of July 19th a suggested design for a streamlined sporting sidecar. Some time ago I drew a somewhat similar design for a sporting sidecar de luxe, which, though of a sporting shape, gave at the same time the maximum degree of comfort.

The average sidecar, with its high back, is, to my mind, very ugly; while, on the other hand, the sporting torpedo-



A reader's design of streamline sporting sidecar. (See letter A. Arnold.)

shaped sidecars, though pleasing to the eye, are most uncomfortable, and expose the occupant to the wind or rain from the waist upwards.

The sidecar I have drawn is of round section and made of aluminium, which can either be enamelled or left polished. It is fitted with a hood and a small windscreen. The hollow tail could be utilised as a boot for carrying tools, etc.

ARTHUR ARNOLD.

#### AN APPRECIATION.

Sir,—I feel constrained to write and thank you, on behalf of my chum and myself, for the good results which have followed upon reading your excellent paper. It was through the medium of *The Motor Cycle* that we were enabled to get into the Royal Engineers as despatch riders. We are now on draft, after having completed a course of training

which, I must say, has been most interesting and instructive. You may be interested to hear that your paper has a great vogue, and on Thursdays there is always a rush to obtain a copy from the boy who weekly visits the camp. We are going to a place which is not far south of the "line," and it will be interesting to see how the modern motor cycle stands up to the work under tropical conditions. I have always followed with great interest the discussions in motor cycle journals about Colonial models, and the opinions expressed as to ground and mudguard clearance, frame construction, etc., and I hope, upon my return, to be able to express an opinion which may, perchance, carry a little weight. So far I have enjoyed both the work and the life thoroughly.

IAN MORISON, Pioneer M.C.

#### INVERTED CONTROL LEVERS.

Sir,—Capt. Lindsay is quite unnecessarily severe in his sarcasm anent those riders who "require lever hooks to anchor themselves," etc.; and surely a rider who finds such excessive fatigue from the use of inverted levers should also be advised to "revert to pedestrianism or travel by train."

J.W.

Belfast.

Sir,—I have read many letters in your columns by Capt. Lindsay, but never before found myself unable to appreciate his point of view, if not entirely to agree with him. I find that the inverted lever comes to hand in the most convenient position for operation; the greatest movement is at the end adjacent to the two most powerful fingers, viz., the first and second, and the other two are not called upon to do any work at all. When using the ordinary lever I find that it is more comfortable to draw the hand back and again use only the first two fingers, but this is not nearly so pleasant—that is to me personally.

Really it is only a matter of individual preference, and I do not think that either lever need cause undue fatigue—at least I have never found it so—nor have the enclosed wires ever given me any trouble.

JOHN HOLLAND.

Sir,—I have been a regular reader of your valuable journal for the last six years, and have derived much pleasure, and sometimes amusement, from the correspondence columns. Never, however, have I been so amused as by the letter appearing in the issue of July 26th over the name of Capt. Lindsay on the subject of inverted levers.

I have occasionally been tempted to seek an opportunity to express my views on some of the topics discussed in your columns, but have hitherto refrained. The ludicrousness, to my mind, of the views expressed in the letter referred to invite comment. I have often read letters, etc., in your paper contributed by Capt. Lindsay, and have assumed him to be an expert, but really when he avers that most of the "hard" (!) work of operating inverted levers falls on the third and fourth fingers of the hand, it makes one wonder what is an expert.

Ask one hundred motor cyclists which fingers are mostly used in the operation, and ninety-nine of them will declare the first and second. No wonder Capt. Lindsay complains of the delicacy of touch if he seeks for it by the preponderating use of the third and fourth fingers! These are the very two fingers that do the least work.

The only point where the normal Bowden lever scores over the inverted lever is in the accessibility of the wires when they want repairing. If they are exposed to the wet, then, of course, they often want repairing; but if inverted levers are used the wires are protected, so that this point loses



much of its advantage, inasmuch as repairs are not required so often.

As regards the hands being fatigued, how is this? To what extent are the inverted levers used in the course of a hundred miles run? When you come to think it over, these levers call for very little operating unless one drives on the exhaust to a big extent.

The only qualification I claim for contesting Capt. Lindsay's remarks is that I have averaged 20,000 miles per year for the last five years, all on Triumphs, my present machine being the War Office model. A finer machine I never wish to ride.

Thanking you for providing so much interesting reading matter each week,  
A.H.F.  
Brighton.

Sir,—Capt. Lindsay, in his letter *re* inverted controls, seems to object to these on the score of *fatigue* involved in their use. May I ask him the following questions? (1.) How often is it necessary to use these levers, and what amount of fatigue is caused by them? (2.) Is there not just as much *fatigue* to be expected in the use of the other form of controls? Or has he in mind some special form of control which involved no hard labour in working it? (3.) Will he please explain to me what he means by want of delicacy—in the use of these controls?

I have ridden motor cycles since the very early years of the sport. I have ridden for hours in trials and competitions. I ride very long and trying journeys, and use the machine entirely for business purposes, and at present also for work of national importance and special police work. In spite of this I have still to experience my first *fatigue* from the use of inverted levers on my machine.

One does not play with these all the time when riding. The use of them is really a very little thing on the whole, so that one can safely say there is very little inconvenience, bar the question of replacement when wires, etc., break: but in regard to this latter, the inconvenience is very slight compared to the want of neatness, protection, etc., in the other form suggested. I ride a heavy Triumph sidecar of the War Office pattern, and after 20,000 miles I have still to replace my first broken wire. The same applies to my lightweight Triumph—18,000 still leaves the first wire to be replaced.

If riders would only remember that good machines, like good horses, want looking after, and if they would only clean their machines, and oil them sometimes, they would not get the trouble of broken parts. Capt. Lindsay and others seem to think that manufacturers must always be wrong; but surely the experience of the firms, together with the complaints they get from riders, must teach them something; and if a maker sticks to inverted controls we may be sure, as a rule, he does so because experience proves they are the best, in spite of the whims of one or two riders.

Probably the conditions under which Capt. Lindsay rides are very, very different, but I feel sure he does not suggest that the use of his control levers, because they happen to be inverted pattern, tire him out when riding, whilst a little care will always prevent many broken wires.

(REV.) R. C. MEASURES.

#### A LONG RIDE.

Sir,—I recently made the journey from here (Newburn, S.O.) to Farnborough in a day, on a two-stroke machine, much to the surprise of all my friends. I have made enquiries to find out if any one had done a longer day's ride on a two-stroke, but have not heard of any. Can any of your readers claim a longer run in one day?

It might interest some of your readers to know that I bought the machine—a 2½ h.p. Alldays Allon 1915 model—second-hand on March 4th, this year, and that ever since then I have done thirty miles a day, seven days a week, on it. I started out for Farnborough without any preliminary tuning up at 6 a.m., and arrived at Farnborough at 9 p.m. exactly. My riding time for the journey of 310 miles was 11½ hours, an average of just over 26 m.p.h. for the whole run. Petrol consumption was 85 to 90 m.p.g. I had only one involuntary stop, due to a burst back tube. It says much for the machine that not once during the whole journey did the engine show signs of flagging, as I have been told two-strokes do on a long journey. Until I possessed the Allon I rather despised the little two-stroke machine. I also returned in one day. M. TOWERS.

#### SIDECAR V. RUNABOUT.

Sir,—Discussion often arises in your valuable paper on the question of the real and only light car which a man of moderate means can buy. The trial of the Scott, which you described some months ago, will revive the latent feeling in the hearts of holders of combinations that some time in the near future they will be emancipated from their troubles. Now, I am the owner of a 6 h.p. A.J.S. combination, which for two years has been the source of joy to myself and wife. We have done three tours a year in a careful and moderate way, carrying our food and lunching on the roadside, as much for the exhilarating freedom as for the economical aspect of the question. Every week-end has also found us performing local rides of more or less distance. In all these rides I have never known what it was to be hung up in any shape or form, and the sum total of repairs during this period has been *nil*. A finer mount it is impossible to select, and it would be a good thing if some of the recent writers on the American mounts could have a season on one of these machines, and also hear the woes of their less fortunate comrades on these foreign machines. As a matter of fact, I have never met a rider of an A.J.S. who did not praise the machine in the highest terms and want nothing better.

And yet also I, in agreement with dozens of couples who ride these combinations of different makes, am heartily sick of the disadvantages of their mounts, especially when they are paying a good price for them. When the weather is wet the driver gets plastered from head to foot, and has to wear clothes of an extraordinary nature, and then cannot keep dry, while in the hot, dry days of summer both driver and passengers are covered with the dust of the road, and are almost unpresentable when they require to spend a few hours looking over a seaside resort or other place of interest. There is not the least doubt that everybody knows that you are a couple from a sidecar combination. And yet we are seeing in the papers that the firms are vying with each other in producing new models of still increasing price, with a greater horse-power and other so-called improvements, without endeavouring to tap the greatest source of all.

How many of the riders of combinations of any great horse-power, say 4½ h.p. and over, ever take their machines out solo? I venture to say that not 5% do. Well, why are the other 95% doomed to ride a sidecar combination when they do not want a solo bicycle, and heavy combinations are not now detached for housing. They are not objects of beauty; the engineering aspect is *nil*, for they are diametrically opposed to mechanical principles, and they give us no protection against the elements. No, we want a revolution in this respect, and it is to be hoped that the war will bring it.

Now, taking up the question of the Scott light car, I would welcome it, and others seem to have done so, not because I agree in many ways with the points of the vehicle, but because it could be made as reliable as the combination, with the enhanced sociability and comfort of the passengers. I would buy one for this reason, but is it as good as the Morgan? In appearance certainly not, in stability again not, and it is hard to find wherein it is an improvement, except in the matter of a three-speed gear and shaft drive. Competition on these lines, I think, would bring a model with the comforts of a car, and far cheaper to make and buy than a good sidecar combination.

I am convinced that if a firm made a speciality of some simple design on the three-wheeled Morgan lines, and made some thousands on the Ford lines, they would sell like wildfire at about £80, and if the Ford car can be produced in America at £75, surely an 8 or 10 h.p. three-wheeler could be sold for £80 here.

It must be remembered that the housing question has changed since the sidecar superseded the forecar. Then it was common to have widths of 30in., and the machines could pass through ordinary doorways.

Gradually the manufacturers made the luxurious combination wider and wider and heavier and heavier until it was no longer possible to do this and still more impossible to detach it.

Now we find the big combination as wide as, and some of them wider than, the Morgan, but still the public buy them. I should like to hear your readers' views on the above subject.

Birmingham.

MORE COMFORT.



## CARRYING A SPARE TUBE.

Sir,—Respecting the carriage of spares, many regard the handle-bars as the place of least vibration for the tube. I find the best place for this spare is on the underside of the saddle. I took the saddle off, unfastened two nuts, put in two straps, filed off the extra lengths of bolt, and then fastened in the well protected tube. With the lowest position of the saddle there was ample distance from the mud-guard. On a solo machine I consider this position to have less vibration and to be less unsightly.

Your articles "The Critics" are very attractive and instructive to me as a novice.

R. G. HOWARD.

## AVERAGE SPEEDS.

Sir,—The figures of my last long run may be interesting as bearing out what "The Critics" say of average speeds. The original log book will be sent to you if desired.

Peterhead to Chapelhall, 177 miles, 20 m.p.h. September 25th. A little petrol and oil in tank caused low speed.

Chapelhall to Londonderry, 169 miles, 22 m.p.h. September 26th. Puncture near Brough.

Londonderry to Elton, 140 miles, 22 m.p.h. September 27th. Late start caused low mileage.

Elton to Great Missenden, 72 miles, 20½ m.p.h. September 28th. Cross-country roads.

Total, Peterhead to Great Missenden, 558 miles, 21 m.p.h.

Machine: Single-cylinder 1913 James 558 c.c. combination, but with light wicker body on this run; B. and B. fixed jet.

I find a large power to weight ratio, a hot inlet pipe, and retarded ignition are the chief essentials of success with neat paraffin.

W. R. DEUCHAR.

## TWO-STROKE PISTON RINGS.

Sir,—Replying to "Piston Rings" letter in your issue of July 19th, my experience with two-stroke engines is identical with his.

I carried out extensive investigations in order to discover a complete remedy for the loss of compression after cleaning the rings.

I have met with a certain amount of success, and I find that by partially filling the piston ring grooves with a specially prepared graphite compound much better compression is obtained after cleaning than before; further, that the tendency for the rings to gum up is very considerably reduced.

My experiences of this compound have been of such a satisfactory character that I consider it desirable that data should be obtained from other users.

If "Piston Rings" would care to communicate with me I would be pleased to send a sample for him to try.

My experiments have been carried out on Peco engines, and if the results obtained are equally as good on other makes it will greatly enhance the popularity of this type of engine.

J. J. CANNON.

## KONKING ON HILLS.

Sir,—I was very interested to read in the columns of your excellent paper of H. W. Williamson's trouble with konking, which appeared in your issue of July 19th. I own an old 3½ h.p. single, which has lately developed absolutely identical symptoms to those he describes.

I have lately had my bearings rebushed, and a friend suggested that the trouble was caused by the new bearings being tight, especially after the engine had warmed up, but I was never very convinced by the idea. I may say that the konking has resulted in the big end developing a great deal of play, after only 600 miles running, since it was renewed. That bearing at least is not too tight.

F. G. G. DAVEY.

Sir,—Lieut. Williamson's query, re his 79×100 engine konking on hills, prompts me to suggest two likely causes: (1.) Excessive piston clearance or slight distortion, brought to his notice forcibly by. (2.) the konking proclivities of present-day petrol.

I venture to suggest that on benzole or good petrol these symptoms would not have arisen. To improve matters I would suggest a lowering of his top gear ratio as the simplest expedient. I have found 4½ or 4⅔ to 1 quite high enough for general road work with this engine, but I have noticed most other users of this particular machine use gears in the immediate neighbourhood of 4 to 1, or even higher.

A. LINDSAY, CAPT. R.A.M.C.

## THE WEARING QUALITIES OF FLAT TWINS.

Sir,—I have just had the engine of my A.B.C. down for decarbonising, etc., and thought the following particulars might interest your readers: The machine is a 1914 model, and has run over 7,000 miles; no single part shows the slightest signs of wear or looseness, with the exception of the rockers of the overhead exhaust valves, and only the slightest shake here. The carbon deposit collected in 2,500 miles was nowhere more than ⅛ in. thick, and the average less than ⅓ in., and it in no way affected the running of the engine, which cannot be made to konk. I think Mr. Bradshaw is to be congratulated on a really fine piece of work. The petrol consumption is about 90 m.p.g. solo and 80 to 85 m.p.g. with a sidecar, and the lubricating oil runs the machine 500 to 600 miles on the tankful of three pints capacity. The running of this machine has been a complete revelation of what motor cycling can be, although I have ridden dozens of machines since 1903, when I commenced riding. I am sorry to say I have no connection with Mr. Bradshaw's firm, for I believe I could have sold a dozen machines this month to total strangers who were interested in the machine on the road.

R. C. MEESON.

## ALUMINIUM COOLING.

Sir,—One's first impulse upon reading such a palpably misleading communication as that signed "E. V. Hammond, M.E.," is naturally to ignore it as "not worth powder and shot." On second thought, however, it seems unfair to your technical readers to do so.

It may be as well, therefore, to point out the basis of his sneer that "the whole idea is as old as the automobile industry" is no discovery of his. Had he "carefully read all your articles on the subject," as he claims to have done, he would have been aware that this fact forms the *raison d'être* of two of them, and that you have cited Patent Office records in support thereof.

Echcing Macanlay's apology for "inflicting fourth-form learning upon our readers," I beg to state that at the time the idea in question originated:

(a) "Engineers' pocket-books" were well known, and

(b) So was the melting point of aluminium.

Further, that it was matter of common (if unconscious) knowledge even then—to the engineer no less than to every old woman with a flat-iron—that

(c) The thermal properties of metals included not only the absorption and conduction of heat, but also a strong—and oftentimes inconvenient—tendency to radiate the said heat rapidly into the surrounding atmosphere.

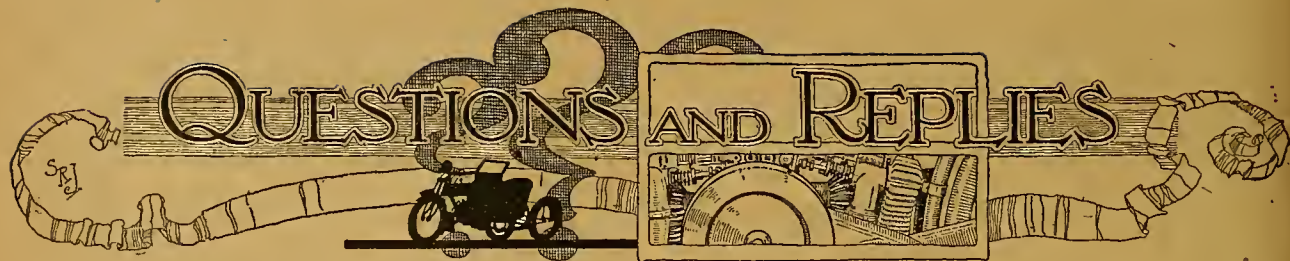
My only excuse for calling attention to these elementary facts is that Mr. Hammond's contention depends entirely upon his ignorance or wilful disregard of them. I imagine that it must be tolerably obvious to the majority of your readers that, by the use of a close-fitting jacket of high-conductivity metal, the superfluous heat will be quickly and continuously drained from the liner and distributed throughout the mass of the jacket metal. It only remains to provide the latter with a sufficient area of properly-designed radiating surface to ensure dissipation of the heat at a predetermined rate, with the maintenance of any desired temperature, within limits, in the cylinder walls and combustion chamber.

Apart from my own experiences with the pioneer engines built on this principle, I would point out that Mr. Wardle, with three years' experience, states that "the cooling effect of the aluminium jacket was so pronounced that, when running along the road, it was easily possible to hold one's hand on the fins." Mr. Hammond, on the other hand, with the aid of an "engineer's pocket book" and no experience at all, assures us (in effect) that Mr. Wardle is mistaken: that the latter gentleman was really paving the roads with "blobs of metal." Is Mr. Wardle quite sure that it *was* the cylinder he held? Can he lay his hand on his heart and swear that he was not holding his boot-toe, or the footrest, or—horrible thought—a tankard of "Government ale, 1917"?

It is not stated by whom the "juggling with various metals" was, or is, being carried out. Possibly this is a reference to the well-known experiments of that eminent expert Professor Shinio, who is universally recognised as an adept in this class of work. The report of this popular scientist (per favour of Capt. Bruce Bairnsfather) is awaited with calm confidence, not untinctured with a natural anxiety.

R. AYTON.





A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of the envelope, and should be kept distinct from questions bearing on technical subjects.

### Timing a Two-stroke.

?

(1.) Please tell me how to time a 2½ h.p. two-stroke, fitted with a Dixie magneto (fixed ignition). (2.) What is the right size of jet for such a machine, as the petrol consumption is rather high?—C.K.

(1.) The engine should be timed in the following manner: If for a hilly country, set the spark to occur at ½ in. below the top of the stroke; if for a flat country, ¾ in. from the top of the stroke; when in this position the points should be in the act of breaking. (2.) Try a 24 jet.

### Fitting Larger Tyres.

?

I have a 1915 B.S.A. sidecar combination fitted with 2½ in. tyres. Will you kindly let me know: (1.) If for bad roads it will be any advantage to fit a larger tyre to back wheel? (2.) If a larger tyre be fitted, will it make any difference to the engine?—W.H.F.

(1.) Certainly it would be an advantage to fit a larger tyre to the back wheel. Always use the largest you can fit with comfort. (2.) Fitting a larger tyre slightly increases the work the engine has to do, but not to any serious extent. A 3 in. tyre can be obtained to fit a 2½ in. rim.

### Carburettor Flooding.

?

I have a 1914 o.h.v. 2 h.p. Calthorpe Precision, fitted with a B. and B. carburettor, which has a size 26 jet. (1.) When the machine is on the stand (engine not running) the fuel (petrol and paraffin) drips from the bottom of the jet until the float chamber is empty. Is the jet the wrong size, or does the float needle require grinding in? (2.) How could I adjust the carburettor so as to take full air? If I bring the air lever to within half an inch of the throttle the engine splutters and stops. Is this the fault of the jet? (3.) After the engine has been running, and I wheel the machine forward or backward, a bluish-white smoke comes from the air port. What is the cause, and how can I remedy it?—P.N.L.

(1.) If the float chamber empties itself the needle can hardly be at fault, as it seems effectively to prevent further spirit from entering the carburettor. It does not prove that the level is too high, and we are inclined to think that there is a bad leak at the bottom of the jet. Try a new fibre washer, and test

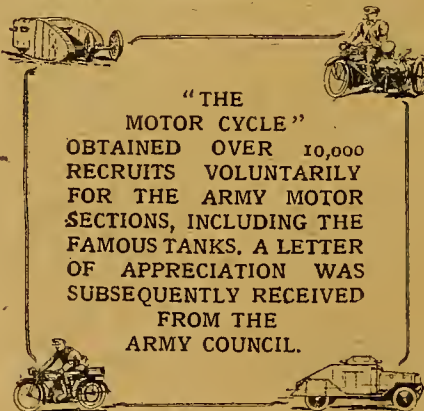
the tiny screw which is fitted to enable the duct to be cleaned out. (2.) There is nothing at fault from the symptoms. The amount of air permissible depends upon the jet size. If your engine pulls well, leave well alone. (3.) This is a common symptom with this particular make of carburettor, and is caused by half vaporised petrol being blown back from the air intake of the carburettor.

### Remagnetising Magnets.

?

I would like to know the exact amount of wire and the gauge for remagnetising magneto magnets from a 116 volt circuit (direct current).—R.I.

We should recommend you to wrap three turns of No. 20 wire round each magnet, after having first tested the polarity of these by means of a compass. Round the north pole the wire should be wound counter-clockwise, and clockwise round the south pole of the magnet. The current should be left on for about half an hour, and the magnets should be tapped at intervals with a hammer.



### Too Large a Jet.

?

I have a 2½ h.p. Sun two-stroke motor cycle, of which consumption of petrol is too heavy, as it will only do fifty miles to the gallon. Should

I change the jet for a smaller one?—D.E.H.

You do not say what size of jet you are using, and there may be other causes for high consumption, but we should certainly recommend you to fit a smaller jet, which might not only reduce the consumption of fuel, but also cause the engine to run better. Also look carefully for leakage in tank and pipes.

### The Lighting Regulations.

?

I have just bought a 6 h.p. flat twin Humber combination, and shall be glad of your advice re lighting. (1.) Does the head light on the handle-bar in the customary position illuminate the number plate "within the meaning of the Act"? (2.) If illumination of the plate in the rear is necessary, will an oil lamp keep alight satisfactorily if fixed on the sidecar? (3.) Is an oil lamp satisfactory, apart from the amount of light, on the front near side of the car? (4.) What intensity of illumination is now permissible in Surrey?—S.J.R.

(1.) Yes, the head lamp in the ordinary position on the handle-bars complies with the regulations as regards illuminating the number plate. (2.) The illumination of the plate in the rear is not necessary, though, of course, a red tail lamp must be used. (3.) Oil lamps are usually found unsatisfactory for attachment to sidecars. (4.) An ordinary motor cycle lamp bearing one thickness of tissue paper over the lens will comply with the regulations.

### Rattle.

?

I have a Revere two-stroke. I have had it only three months, and it was new when I bought it. There was a 28 jet (B.B. carburettor) in it when I got it, and it used to four-stroke badly. I experimented with jets, and at last got it to two-stroke nicely by mixing a little oil with the petrol and using a 26 jet. A few weeks ago the bicycle began to rattle at 15 or 20 m.p.h., and very much at any speed beyond 20 m.p.h., so I got the engine taken down, and the top ring was slightly seized. I am not sure whether this rattle is in the engine or in some other part.—S.B.

To find out whether it is the engine of your machine or some loose fitting that is causing the rattle of which you complain, run the machine with free engine, or, if it is a fixed model, with belt removed, down a steep hill, and note if the rattle then occurs. It is very possibly caused by the valances of the mudguard striking the inside of the forks. If you find you trace the trouble to the engine, it is clear that you are suffering from what is known as two-stroke rattle. The cause of this has never definitely been settled. You might effect an improvement by slightly bevelling the top and bottom of the piston, so that there is no danger of this catching the edges of the ports.



**Taking Down an Engine.**

I sent my 1912 Triumph to be rebushed, and the engineer has been called up, so I have got the engine back in parts. Would you tell me how to re-time the timing side of the crank case? The pulley half, I find, comes away easily. I am sending for your book, "Motor Cycles and How to Manage Them."—G.S.T.

To remove the timing gear side of crank case you will have to detach the pinion wheel from the end of the crankshaft. This could most easily be done by means of a wheel drawer made for such purpose. Another method is to tap four wedges equidistant round the pinion and between it and the crank case. Then by means of a full nose punch give the end of the shaft a sharp tap.

**Restive Horse causes Accident.**

I have received the following letter from a man who is unknown to me: "I have been informed that it was your motor cycle that caused my horse to bolt on July 10th, causing me bodily harm to the extent I am not fully aware of yet, not talking of the damage done to my horse and cart. If you consider recompensing me, I am willing to leave it to any arbitration you wish, or, if not, I expect I will have to take legal proceedings. Hoping to hear from you in the meantime." I know nothing of this accident, except, from hearsay in this village, that I am said to have been concerned in it. I am told that complainant alleges that it occurred at a hairpin bend about two miles away. He alleges that his horse showed signs of restiveness as I came forward, and that I "shot past," and that when I was past the horse bolted round the turn, and when out of my sight the cart overturned and the man was thrown out and cut in head and hands, and the shafts of the cart broken and horse's knees cut. I have no recollection of meeting a cart at the place, and I certainly met no restive horse, nor received any signal to stop, nor saw any horse bolting, or heard of the accident happening. The road is on rising ground at the spot, and I probably was not exceeding a speed of 10 m.p.h. I believe I am not known to complainant personally, but a man who came to his assistance at the time of the accident told him I had just passed up a few minutes before. I did pass about the time the accident is said to have happened, but there were other motorists on the road the same evening. My machine has an efficient silencer, and I am an experienced and careful driver, and am in Government service.—J.L.

We have submitted your query to our legal adviser, who replies as follows: "I cannot find that any case has been decided on all fours with the facts given by your correspondent. There is a case where a dog ran out and snapped at the mare's heels, which caused her to plunge and injure herself, and it was held that the owner of the dog was liable. The position with regard to the motor cyclist is, however, very different.

If your correspondent were going along the road at a proper speed, and with an efficient silencer, he ought to succeed in any action which is brought against him. He would not be liable if the horse bolted through exceptional timidity or restiveness; and the whole question of liability depends upon whether your correspondent was properly riding the motor cycle at the time, and whether the fear inspired in the horse was under the circumstances natural and what might be expected as the result of any particular noise which your correspondent may have wrongfully caused."

**Charging an Accumulator.**

Please tell me (1) the number of 40-50 c.p. lamps a 240 volt direct current should pass through to charge a 40 ampere one hour accumulator. (2) How to tell when the accumulator is fully charged.—C.P.M.

(1.) The lamps you mention take about  $\frac{3}{4}$  ampere each. The charging rate is marked on the accumulators. This must not be exceeded, but a lower rate may be used. Four lamps will probably be sufficient. The charge will take from ten to twelve hours or more. (2.) When charged the acid will froth over, and the accumulator should register  $4\frac{1}{2}$  volts, if it be a 4 volt accumulator.

**Unsatisfactory Running.**

Would you please let me know what is wrong with my 6 h.p. twin. Recently I broke the front cylinder at the bottom where it joins on to the crank case, and got it electrically welded. Now, after going about two miles, the engine, on getting hot, starts to misfire on the least incline, and on hills misfires and stops altogether. (These hills it used to fly up.) Give it a minute or two to cool and it will go fairly well until it gets heated up again. I have fitted new exhaust valve springs. Can there be anything wrong with the magneto when the machine is going at a fair speed, as I have never touched it (of course, I oil it now and again), and I have now had it three or four years?—A.K.M.

Probably the engine requires to be run in after the repair. It is very unlikely that the magneto is at fault, and the trouble is more likely to be due to the fact that you are using an unsuitable plug, which causes pre-ignition when the work is hard. Try a good single or double-point plug with substantial electrodes.

**Enamelling a Motor Cycle.**

I have an 8-10 h.p. combination outfit, similar to the big Matchless combination. Could you give me some idea as to how much enamel I should require to re-enamel it? And could you give an idea of the procedure as regards cleaning before applying enamel? There is also another point on which I should like your opinion. The engine is a Precision 8-10 h.p. V twin. When it was last reassembled the thread on the induction pipe was crossed, and now the induction pipe will not screw tightly to the cylinder. I have packed the joint with asbestos string and bound it with copper wire. Will this necessitate a new induction pipe, and should I have much difficulty in getting one?—G.H.H.

A shilling tin of enamel should be sufficient. To make a really good job of it, you should clean your machine very carefully, polish with emery paper, and then wash with hot soda and water, and carefully dry before applying the enamel, which should be done in a place quite free from dust.

Provided that your induction pipe can be firmly fixed, and there are no air leaks, you will be able to get on without a new pipe, which would probably be difficult to obtain at the present time.

**READER'S REPLY.****A Mysterious Pulling Up.**

I notice "R.E.B.'s" trouble with his two-stroke in *The Motor Cycle* of July 19th. I myself had the same trouble with an Ivy two-stroke, viz., the machine would slow up, but on raising the exhaust it would invariably start off again. Flooding the carburetter would have the same effect. Now in my case the trouble was due to back pressure, and the permanent removal of the extension pipe to the exhaust box (together with a thorough cleaning of exhaust port, exhaust pipe, and box) set matters right. I advise "R.E.B." to try this, as I had an enormous amount of trouble, and it was a long while before I found out the remedy.—TWO-STROKE.

**RECOMMENDED ROUTES.****BURGESS HILL TO PETERSFIELD.—M.B.**

Burgess Hill, Cowfold, Billingshurst, Petworth, Midhurst, Rogate, Petersfield.

**WESTON-SUPER-MARE TO ABERCARN.—E.H.**

Weston-super-Mare, Congresbury, Flax Bourton, Clifton, Filton, Stone, Cambridge, Gloucester, Newnham, Lydney, Chepstow, Newport, Abercarn. Approximately 110 miles.

**CASTLE BROMWICH TO MINEHEAD.—J.H.**

Castle Bromwich, Birmingham, Alcester, Evesham, Teddington, Cheltenham, Painswick, Stroud, Nailsworth, Bath, Marksbury, Chewton Mendip, Wells, Glastonbury, Bridgwater, Nether Stowey, Williton, Minehead.

**ANNAN TO LONDON.—G.L.S.**

Annan, Carlisle, Penrith, Kendal, Kirkby Lonsdale, Settle, Skipton, Ilkley, Otley, Harewood, Aberford, Ferrybridge, Doncaster, East Retford, Newark, Grantham, Stamford, Stilton, Buckden, Biggleswade, Hatfield, Barnet, London.

**COVENTRY TO MARGATE.—H.W.W.**

Coventry, Dunchurch, Daventry, Towcester, Stony Stratford, Penny Stratford, Dunstable, St. Albans, Barnet, London, Greenwich, Dartford, Gravesend, Chatham, Sittingbourne, Faversham, Canterbury, Margate.

**WOKINGHAM TO AYSGARTh.—S.T.**

Wokingham, Twyford, Great Marlow, High Wycombe, Princes Risborough, Aylesbury, Winslow, Buckingham, Towcester, Northampton, Market Harborough, Leicester, Newark (by Fosse Way), East Retford, Doncaster, Ferrybridge, Aberford, Wetherby, Boroughbridge, Ripon, Masham, Aysgarth.



## AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average. The word "combination" indicates a sidecar outfit as supplied by the makers, while "sidecar" implies that the fitting has been carried out by the owner.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3½ 2-speed .....	—	£40
Abingdon ..	1914	5-6 3-sp. side car. ....	—	£54
A.J.S. ....	1916	6 combination ..	£58	£60
" .....	1914	6 combination ..	—	£60
" .....	1916	4 combination ..	—	£78
Allon .....	1916	2½ 2-speed .....	£31	£35
" .....	1914	2½ 2-speed .....	—	£27
Ariel .....	1915	3½ 3-speed .....	—	£43
" .....	1914	5-6 combination ..	—	£51
Bat .....	1914	6 3-speed .....	—	£48
Bradbury ..	1914	4 2-sp. sidecar ..	—	£41
Brough .....	1916	3½ 3-speed .....	—	£55
B.S.A. ....	1916	4½ sidecar .....	£61	£66
" .....	1915	4½ sidecar .....	£52	£58
" .....	1912	clutch .....	£25	—
Calthorpe ..	1916	2½ 2-speed .....	—	£30
" .....	1915	2½ 2-speed .....	£23	£26
" .....	1916	2½ 2-stroke .....	—	£30
Clyno .....	1915	2½ 2-stroke .....	—	£26
" .....	1915	6 combination ..	£68	—
" .....	1914	2½ 2-stroke .....	£22	—
Connaught ..	1915	2½ 2-stroke .....	£20	£25
Douglas .....	1916	2½ 2-speed .....	—	£46
" .....	1915	2½ 2-speed .....	£44	£42
" .....	1914	2½ 2-sp. ed .....	£35	£36
Enfield .....	1916	6 comb. nation ..	£78	£84
" .....	1915	6 combination ..	—	£70
" .....	1916	3 2-speed .....	—	£45
H.-Davidson ..	1916	7 combination ..	—	£84
" .....	1915	7 combination ..	£70	£65
Henderson ..	1916	7 combination ..	—	£100
Hazlewood ..	1914	6 3-speed .....	—	£39
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	5 combination ..	—	£70
" .....	1916	7-9 combination ..	—	£81
" .....	1915	7-9 combination ..	—	£71
James .....	1916	4½ combination ..	—	£70
" .....	1916	2-sp., 2-stroke ..	—	£31
Lea-Francis ..	1916	3½ 3-sp. sidecar ..	—	£67
" .....	1915	3½ 3-speed .....	—	£55
Levis .....	1916	2½ Popular .....	£20	£26
" .....	1915	2½ Popular .....	—	£21
Matchless ..	1915	7 combination ..	£80	£83
New Hudson ..	1916	2-sp. 2-stroke ..	—	£28
" .....	1916	4 combination ..	—	£60
New Imperial ..	1916	2½ 2-speed .....	—	£35
" .....	1915	2½ 2-speed .....	£26	£27
Norton .....	1916	3½ 2-speed .....	—	£52
" .....	1915	3 T.T. ....	—	£43
O.K. ....	1916	2-stroke .....	—	£19
P. & M. ....	1915	3 combination ..	—	£65
" .....	1914	3 2-speed .....	—	£37
Premier .....	1915	3 2-speed .....	—	£28
" .....	1914	3 2-speed .....	—	£43
Rover .....	1916	3 3-speed .....	£52	£52
Royal Ruby ..	1916	2-stroke .....	—	£24
Rudge .....	1916	3 Multi .....	—	£46
" .....	1915	3 Multi .....	£35	£40
Scott .....	1916	3 combination ..	£55	£58
Sun .....	1915	2½ 2-stroke .....	£20	—
Sunbeam .....	1916	8 combination ..	—	£100
" .....	1916	3½ solo .....	—	£76
" .....	1915	3½ combination ..	£75	£70
Triumph .....	1916	2-sp. 2-stroke ..	£38	£38
" .....	1915	4 countershaft ..	—	£35
" .....	1915	2½ 2-sp. 2-stroke ..	—	£25
" .....	1914	3½ 3-speed .....	£39	£41
Zenith .....	1915	8 Gradua .....	—	£61



## Messrs. Harrods, Ltd.—New Premises.

The motor showrooms of Messrs. Harrods, Ltd., are now at more convenient premises, 118, Brompton Road—nearly opposite the main building.

## Saddle Repairs.

Messrs. Brooks ask us to make an appeal to trader and private owner alike to withhold—at least, for a period—all repairs of cycle and motor cycle saddles which are not of vital urgency.

## Dunlop Tyre Prices.

We are informed that prices for Dunlop motor and motor cycle tyres have been revised, and that copies of the revised wholesale and retail price lists were posted to the trade on 21st July.

## Robbialac.

A useful leaflet is to hand giving hints to amateurs who may be renovating their sidecar or motor cycle, together with a price list of the various productions of Messrs. Jenson and Nicholson, Ltd. These leaflets will be sent post free on application to the Robbialac Works, Stratford, London, E.15.

## Air Raids and Motor Cycle Insurance.

It may not be generally known that the ordinary motor cycle insurance policy does not cover loss in the event of damage resulting from air risks. In this connection Messrs. British Dreadnought Underwriters, Ltd., have prepared a special policy covering all loss at a very slight premium, full particulars of which Mr. Harford G. Olden will be pleased to furnish upon request.

## British v. German Trade.

A group of British capitalists and manufacturers, with live business organisation, already successfully specialising in business formerly monopolised largely by alien enemies, is prepared to co-operate in financing, manufacturing, or introducing on a large scale new lines of wares (German or otherwise). Holders of patents or others interested are invited to communicate with the Editor of this journal, who will pass over the letters to the manufacturers concerned.

## Harvey Frost and Co., Ltd.—Extension of Premises.

The West End Branch of Messrs. Harvey Frost and Co., Ltd., formerly at Charing Cross Road, has been transferred to new premises in Gt. Portland Street, where greater facilities for dealing with demonstration and instruction are now in operation. Enquiries regarding the H.F. Schools of Vulcanising Instruction, and communications intended for the West End Branch, should be addressed in future to 148-150, Gt. Portland Street, W.1. The head offices of the company remain at Gt. Eastern Street, E.C., for the present.

## New Address.

The Barnett Motor Tyre and Rubber Co., of Valley Rubber Works, Limpley Stoke, are removing to their new works and offices, Yerbury Mills, Trowbridge, Wilts.; telephone, 113 Trowbridge; telegraphic address, Vacuum, Trowbridge. These works have been equipped with the very latest machinery and plant for the manufacture of motor and motor cycle tyres, etc.

## Economic Motoring.

To lessen the cost of motoring particularly motor cycling, is the object for which most people concerned are on the look out. Messrs. J. M. Ouseley and Son have in the press a complete little book on the subject, entitled 'Economic Motoring,' which will shortly be published. The author is a well-known motorist.

## Discharged Soldiers and Sailors.

The activities of the Central Committee for Employment of Discharged Soldiers and Sailors connected with the motor industry continue.

It is hoped that the committee will obtain adequate employment for all men who apply. Meanwhile, it is in touch with a number of employers requiring men, and is doing very good work as an introductory bureau.

There is always an up-to-date list of vacancies and of application for employment from discharged soldiers at the offices of the Central Committee, 83, Pall Mall, S.W.1.

At the present time there is a number of useful men requiring employment as chauffeurs, and they carry with them years of experience. Who wants a good chauffeur with a silver badge?

## The Remy Magneto-Generator.

In our last issue we showed a Harley-Davidson fitted with a Remy lighting outfit. The following brief description will doubtless be of interest to those who are not familiar with the workings of this system.

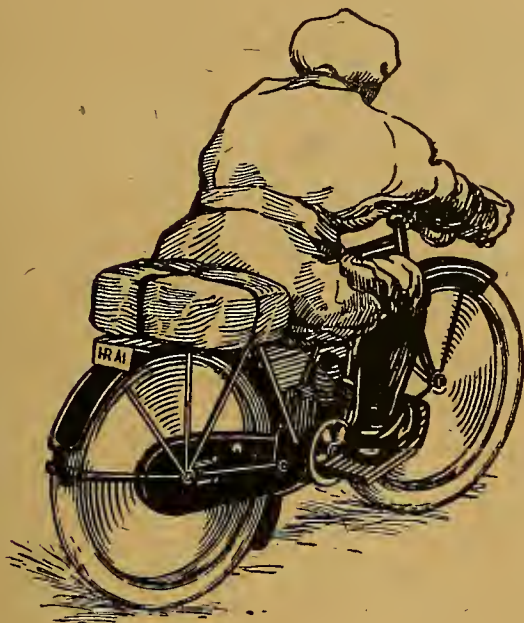
The Remy comprises a generator, three-cell battery, electric horn, head light, tail light, and sidecar lamp. The generator furnishes low-tension current for the lighting, horn, and storage battery, and also high-tension current for the ignition. It combines in the one unit the functions of both magneto and dynamo; consequently, no separate magneto is necessary. As soon as the engine is started the generator furnishes storage current for the battery as well as current for the ignition. Consequently the battery is always kept fully charged and ready for use when the machine is at standstill for lighting purposes.

Should the battery be run down from any cause whatever, such as inadvertently leaving on the switch, it is always possible to start the engine direct on the generator, when current will immediately be furnished alike for ignition, lighting, and horn; the battery will also commence to recharge as soon as the engine is started.

This system has proved most satisfactory in use, and has a distinct advantage in that the rider need not carry two separate units to furnish ignition and lighting current.

In submitting to the Editor articles, photographs, or drawings, contributors are asked to mention whether the illustrations are exclusive, and further to enclose a stamped addressed envelope for return of unaccepted contributions.





## THE RENOLD MOTOR CYCLE CHAIN

All our products are now used  
for War Purposes only.

We cannot supply private cus-  
tomers until after the war.

**HANS RENOLD, LTD.,  
DIDSBUY,  
MANCHESTER.**



Gives perfect  
protection in all  
kinds of weather.

Its advantages may be sum-  
marised as follows—

Will fit any sidecar—does not interfere with  
the steering—can be fitted easily and quickly—  
is entirely under the control of the passenger—  
can be adjusted to any angle—gives ample  
room and little wind resistance—vision is un-  
obstructed in whatever position placed, and  
can be instantly detached when not required.

We can give immediate delivery. Write us.

**Price £3:3:0**

**EASTING WIND SCREEN CO.**

(C. A. Easting & H. Jennings),

78, Colmore Row, Birmingham.

Telephone No 6834 Central.

## THE DUNHILL M.C. JACKET & OVERALLS

AS SUPPLIED TO H.M. GOVERNMENT.

Planned on the saddle, so to speak, the garments  
combining smartness with perfect ease and freedom.

Made in Lightweight Materials, for Summer riding  
and properly ventilated.

The quality is unequalled anywhere for the price.

**GUARANTEED ABSOLUTELY  
WATERPROOF.**

**PRICES:**

Jacket with belt . . . . £2-2-0

Seamless Trouser Overalls £1-4-0

## Dunhills

Ltd.,

359-361, Euston Rd.,  
London, N.W.

2, Conduit St., W

Manchester:  
90-92, Cross Street.

Glasgow:  
72, St. Vincent Street.





# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd., and crossed** & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**ABINGTON**, 5-6 h.p., 1914, with Gloria sidecar, 3-speed, clutch, kick start, fully equipped, excellent condition; £55.—Griffin's, 89, Gt. Portland St., W.1. [6010]

**1914 Abingdon King Dick**, 6-7 h.p. twin, Armstrong 3-speed hub, B. and B. carburettor, Bosch mag., Hutchinson tyres, very light on petrol, nearly new coachbuilt sidecar, very smart combination, perfect order, lamp, horn, and all accessories; sacrifice £43; owner in the service; price £43.—Apply, Clara Villa, Twickenham, London (L.S. Railway Station). [X3162]

### A.J.S.

**A.J.S.** Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

**A.J.S.**, 1916, 2 1/2 h.p., T.T. in really splendid condition; bargain, £45.—Walsall Garage, Walsall. [X3057]

**1916 A.J.S.**, 3-speed, clutch, kick starter, fine running order throughout, complete, all accessories; £50.—P., Marine Hotel, Selvey. [6207]

**A.J.S.**, 6 h.p., 1914, 3 speeds, lamp, accessories, and Swan C.B. sidecar; £60; seen after 5 p.m.—58, Woodfield Rd., Ealing, W.5. [6174]

**A.J.S.** 6 h.p. Late 1915 Twin Combination, Lucas dynamo lighting set, 4 detachable wheels, fully and well equipped, equals new in every detail; 100 gns.—Percy and Co., 337, Euston Rd., London. [5874]



cordially invites you to walk into his well-stocked Showrooms, and inspect the finest collection of "economical" mounts procurable in the Midlands.

Controlling Birmingham Agent for

**INDIAN, ENFIELD, ROVER, BAT, NORTON, A.J.S. ZENITH, NEW IMPERIAL, CONNAUGHT.**

Also Agent for Triumph and James.

What about a Trial Trip on any of these?

**CONNAUGHT**, 2 1/2 h.p., 2-stroke £28 17 6  
**CONNAUGHT**, 2 1/2 h.p., 2-speed .. £36 6  
**ENFIELD**, 2 1/2 h.p., 2-sp., 2-stroke 42 gns.  
**ENFIELD**, 3 h.p., twin, 2-speed .. 55 gns.  
**ENFIELD** Combination ..... 90 gns.

(ENFIELD, NORTON, and B.S.A. models can be supplied with Ministry Permit or Cl. A Certificate)

**JAMES**, 3 1/2 h.p., 3-sp., twin .... £69 10

**JAMES**, 4 1/2 h.p., Combination ... £86 6

**NEW IMPERIAL**, 2 1/2 h.p., 2-speed £40 19

**NEW IMPERIAL**, 2 1/2 h.p., clutch £48 6

**NEW IMPERIAL**, Lady's ..... £50 8

**ROVER**, 3 1/2 h.p., T.T., Phillipson £62 17 6

**ROVER**, 3 1/2 h.p., T.T. racer .... £57 10

**ROVER**, 3 1/2 h.p., countershaft, 3-sp £73 10

**ROVER**, 3 1/2 h.p., 3-sp. Combination £94 10

**CALTHORPE-J.A.P.**, 2-speed .... £39 18

**CALTHORPE**, lady's, 2-speed .... £37 16

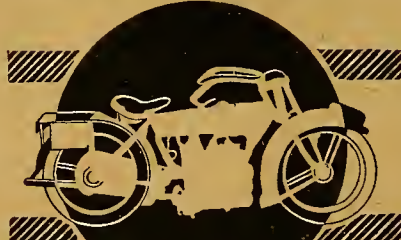
**CALTHORPE**, 3 1/2 h.p., coach Combination ..... 70 gns.

**We close at 1 on Saturdays.**  
Call AT ONCE for keen examination—then ride away the proud possessor of a splendid machine. Special Payments. Liberal Exchanges.

## P. J. EVANS,

87-91, John Bright St., Birmingham.

'Phone: Mid. 662. Wire: "Lycar, B'ham."



## 'Hints and Tips for Motor Cyclists.'

Brimsful of useful information.

Price 1/6

By post 1/8

Home or abroad.

**ILIFFE & SONS LTD., 20, Tudor St., E.C.4.**



## IMPORTANT NOTICE.

Owing to the August Holidays, the issue of "The Motor Cycle" for August 9th must be closed for press earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, August 2nd.

## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the production of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange, or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**1913 A.J.S.**, 6 h.p., 2 speeds, and sidecar; £32.—T. and Bell, Ltd., Motor Dept., Carlton Engineering Works, Tottenham, N.17. [5]

**A.J.S.**, 1915, 2 1/2 h.p., 3-speed, free engine, and 1st start model, with all the best accessories attached; £45.—Wauchope's, 9, Shoe Lane, London. [6]

**A.J.S.**, 1915, 2 1/2 h.p., 3-speed, clutch, T.T. bars, and H. head lamp, generator, rear lamp, to sound tyres, machine perfect throughout; £40. Advertiser, 156, Gt. Portland St., W.1. [42]

**1915 2 1/2 h.p. A.J.S.**, toning model, 2-speed, 1st starter, hand clutch, lamp, and horn, very light and carefully used, nearly new condition throughout; £45.—J. C. Phipps, Sherston, Malmesbury, Wilts. [X3]

**A.J.S.** 1915-16 6 h.p. Combination, 3-speed, 1st starter, speedometer, Lucas lamp, luggage, watch, wind screen, a perfect outfit; £105.—Lamb, 151, High St., Walthamstow, and 50, High Rd., W. Green. [6]

### Alldays.

**ALLON**, 1916, 2-speed, 2-stroke; 28 gns.—Trowell, 78, High St., Hampstead. [5]

**1915 Alldays Allon**, single speed; £25.—A. Wall, Bond St., Stirling, Birmingham. [6]

**COLMORE Depots**, Birmingham and Manchester, immediate delivery of Allon 2-strokes. [X0]

**1916 Alldays Allon**, 2 1/2 h.p., mechanical horn, very good condition; £27/10.—Elce and 15-16, Bishopsgate Av., Camomile St., E.C.3. [0]

**ALLDAYS Matchless**, 3 1/2 h.p., 3 speeds, coach shaft, kick starter, chain driven, coach sidecar, in real good order; £35.—Percy and 337, Euston Rd., London. [5]

**ALLONS**—2 1/2 only for easy terms. 2 1/2 h.p. 2-stroke models, £42, quarter down, and the remainder 12 equal monthly payments; lists on application.—Wauchope's, 9, Shoe Lane, Fleet St., London. 'Phone: 1577. [6]

### Ariel.

**1917 Ariel**, 3 1/2 h.p., not used; sell cheap; exchange; 10, Bartholomew St., Ipswich. [5]

**ARIEL**, 3 1/2 h.p., 1917, 3-speed countershaft model in stock.—Crow Bros., Guildford. [2]

**COLMORE Depots**, Birmingham, Manchester, L. pool, and Leicester, for all models of Ariels. [0]

**ARIEL**, 3 1/2 h.p., free engine, in real good order; condition; £15.—Percy and Co., 337, Euston, London. [5]

**3 1/2 h.p. Ariel**, Bowden 2-speed countershaft, kick starter, also coachbuilt sidecar; £36; splendid condition.—34, West St., Crewe. [X3]



## MOTOR CYCLES FOR SALE.

## Ariel.

**ARIEL**-J.A.P., 6h.p., and sidecar, just overhauled, tyres perfect, lamp set, etc.; £26.—Jones, 56, Chesterfield Gdns., Harringay. [6157]

**ARIEL** Actually in stock.—1917 3½h.p. 3-speed combination; £93/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6004]

**ARIEL** Combination, 1914, 3½h.p., 2-speed, decompressor, Bosch, B. and B., Jones speedometer, electric horn, 3 lamps with generators, spares, a smart outfit.—20, Martaban Rd., Stoke Newington, N.16. [6040]

## Antoine.

4½h.p. Antoine, adjustable pulley, variable B.B. jet, 2 Bosch mag.; £12/10; after 8.30.—1a, Killowen Rd., South Hackney. [6027]

## Auto-Wheels.

**WALL** Auto-Wheel, 1915, good hill-climber, fast; £7/10.—2, Pasture View, Arunley, Leeds. [X3283]

**WALL** Auto-Wheel, in first-class order, practically equal to new; price £8.—Gleurose, Horley Row, Horley, Surrey. [5936]

**AUTO-WHEEL**, 1916 model, shock absorber, excellent condition, very little used, £6/10; Raleigh cycle for same, £3.—Lacey, Crown St., Mansfield, Notts. [5933]

**AUTO-WHEEL** for sale, which has just been overhauled and repaired by us, and which is in excellent condition; £7.—Motosacoche, Ltd., Keumont Works, Willesden Junction, N.W.10. [6056]

## Bat.

1914 Bat-Jap 6h.p. Combination, 3 speeds, Cowey, wind screen, Lucas's lamp, horn, etc., a smart and genuine bargain, £45.—96, Ashbourne Rd., Mitcham. [6166]

**BAT**-J.A.P., 1914, 6h.p., countershaft 3-speed, clutch, kick starter, coachbuilt sidecar, accessories, good condition; £45.—The Premier Motor Co., Aston Rd., Birmingham. [5948]

**BAT**-J.A.P., 4h.p., P. and M. gear, spring frame, shaft drive to magneto, with coachbuilt sidecar, splendid going condition; any trial; £33.—Sutcliffe, Brightside, Buxton. [X3265]

**BAT**-J.A.P. 8h.p. Combination, patent spring frame, coachbuilt sidecar, luggage extension, 3-speed, kick starter, splendid condition; £40.—Harris, 3a, Station Parade, Ealing Common. [6180]

4h.p. Bat, single, Amac carburetter, Bosch mag., tyres good, new back, guaranteed in thorough mechanical order, a serviceable machine, take £25 for quick sale.—North, 34, Selhurst Rd., South Norwood, S.E.25. [X3204]

## Blackburne.

**RIDER TROWARD'S**, 31 and 78, High St., Hampstead—Blackburne, 1912, T.T., 3½h.p.; 19 gns. [5968]

## Blumfield.

**BLUMFIELD**, 5-6h.p. twin, mag., brand new Dynalops; £22/10.—Waudsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [6100]

## Bradbury.

**BRADBURY**, 1914, 4h.p., 3-speed gear, lamp, horn, tools, fine order; £25.—Batchelor, Clarence St., Kingston. [6108]

**BRADBURY**, Bosch, B.B. carburetter, new outer cover, fixed speed, just overhauled; £15, no offers.—Manners, Rednal, Birmingham. [X3303]

**BRADBURY**, 1914, 4h.p., 3-speed S.A. hnb gear, coachbuilt sidecar, splendid condition; £46/10.—Mrs. Davies, Albion House, Presteigne. [5964]

4h.p. Bradbury Combination, Sturney-Archer 3-speed, Binks 3-jet carburetter, perfect working order; £35, or exchange higher power.—Davies, Weudros, Boneath. [X3355]

**RIDER TROWARD'S**, 31 and 78, High St., Hampstead.—1913 Bradbury, 2-speed, clutch, 19 gns., with sidecar 23 gns.; 1912 single speed Bradbury, 14 gns. [5966]

**BRADBURY**, 6h.p., 1914, 4 speeds, kick start, speedometer, lamps, all gears enclosed in aluminium covers, coach sidecar.—Kirkham, Moor Lane, Preston, Lancs. [X3197]

4h.p. Bradbury, 2-speed gear and sidecar, powerful, in the best of running order, good investment at £27/10, complete with accessories.—Wanchope's, 9, Shoe Lane, London. [6074]

**BRADBURY**, 1915, 4h.p., Canoelet C.B. sidecar, N.S.U. 2-speed, F.E., thoroughly overhauled, little used, complete with accessories; £34, or exchange with cash for high-class 6h.p. twin.—Fisher, Chemist, Portland Rd., South Norwood. [6143]

## Brough.

3½h.p. Horizontal Twin Brough, 2-speed countershaft 32 gear and free engine, in sound condition and good running order, fast machine, with accessories to complete; £45.—Wanchope's, 9, Shoe Lane, London. [6073]

## Brown.

**BROWN**, 3½h.p.; £16.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6049]

3½h.p. Brown Combination, 2-speed, countershaft, 32 kick starter, mileage only 5,000, Watsonian coachbuilt sidecar, almost new; £30.—Reid, Jeweller, Hawick. [X3316]

# MR

## Real BARGAINS

**HARLEY-DAVIDSON**, 17F, 7-9 h.p. Swan Combination, ridden approx. 100 miles only, absolutely as new ..... £120 0

**HARLEY-DAVIDSON**, 1915, 7-9 h.p., J model, and Sidecar, elec. equipped, all tyres as new and unpunctured, a very creditable outfit ..... £75 0

**INDIAN**, 1915-16, 7-9 h.p., clutch model, T.T. bars, disc wheel, with lamps, horn, and large exhaust whistle, condition quite equal to new, ridden approx. 7,000 miles ..... £55 0

**INDIAN**, 1915-16, 5 h.p., 3-sp. Combination, with access. tyres unpunctured, enamel unscratched, semi-T.T. bars, very pleasing outfit ..... £68 10

**B.S.A.**, 1916, 4½ h.p., Model K Combination, 3 Lucas lamps, horn, speedometer, condition above the average, 1916 .. £68 10

**LEVIS**, No. 1, 2½ h.p., semi-T.T. bars, Lucas lamp and horn, knee-pads, ridden only 400 miles ..... £32 10

**TRIUMPH**, 1913, 3½ h.p., 3-sp., semi-T.T. bars, a nice little solo mount ..... £35 0

**TRIUMPH**, 1913, 3½ h.p., 3-sp., Combination, with lamps, horn, and usual acc. ..... £48 0

**TRIUMPH**, 1911, 3½ h.p. model, fixed gear, semi-T.T. bars, and accessories ..... £20 0

**ALLON**, 1917 model, 2½ h.p., 2-sp., hand clutch, full kit tools, and Stewart warning horn, ridden 200 miles only, and absolutely like new ..... £43 0

**ALLON**, 1916 model, 2½ h.p., single-speed, outfit just been overhauled by makers, complete with access. .... £25 10

**ALLON**, 1915, 2½ h.p., 2-sp., no clutch, all access., condition very good ..... £26 10

**CHATER-J.A.P.**, 1915, 6h.p., 2-speed, 3-seater Sidecar (1 adult, 2 youngsters), speedometer, lamps, horn, petrol carrier, chocolate finish, has been very carefully used ..... £69 10

**NEW HUDSON**, 1913, 3½ h.p., 3-speed Combination, with lamp, horn, speedometer, machine in extremely good order for 1913 machine ..... £39 10

**FORD VAN**, 1916, 20 h.p., standard, electrically equipped, green finish, white top, interior lined nicely with adjustable shelves, spare detachable wheel and tyre, full tool kit, ridden approx. 1,500 ..... £130 0

**HOLIDAY NOTICE**.—CLOSED for the holidays from Monday, August 6th, until Friday, August 10th.

Hours 9 a.m. to 8 p.m. Open on Saturday till 9 p.m. Closed, Thursday at 1 o'clock.

**WANTED**.—Up-to-date Outfits. We are always prepared to purchase at highest possible price first-class tournaments.

Easy Terms by arrangement. Liberal allowances. Exchanges.

**50, HIGH ROAD, WOOD GREEN.**

'Phone—Hornsey 1956.  
Only depot in this district.

# LA

## Best VALUE

### NEW MACHINES

actually on show.

**ENFIELD**, 1917, 6 h.p., 2-speed outfit .. £115 0  
**ENFIELD**, 1917, 2½ h.p., 2-speed, 2-stroke .. £44 2  
**ROVER**, 1917, 3½ h.p., 3-sp., countershaft Combination with Sidecar ..... £99 4 6  
**JAMES**, 1917, 3½ h.p. twin, 3-speed ..... £69 10  
**JAMES**, 1917, 4½ h.p., No. 6, 3-sp. Comb. .. £87 2  
**ARIEL**, 1917, 3½ h.p., 3-speed, Combination .. £93 10  
**LEVIS**, 1917, 2½ h.p., 2-sp., Model E ... £47 10  
**LEVIS**, 1917, 2½ h.p., single-speed ..... £32 0  
**ALLDAYS ALLON**, 1917, 2½ h.p., 2-speed, hand clutch ..... £47 5  
**ALLDAYS ALLON**, 1917, 2½ h.p., 2-speed, no clutch ..... £44 2  
**ALLDAYS ALLON**, 1917, 2½ h.p., single-sp. .. £37 16  
**CALTHORPE-J.A.P.**, 1917, 2½ h.p., 2-sp., Enfield Sidecar ..... £39 16  
**CALTHORPE-J.A.P.**, 1917, 2½ h.p., 2-sp., with Sidecar ..... £50 0  
**ROYAL RUBY-J.A.P.**, 1917, 2½ h.p., 2-sp. .. £46 0  
**ROYAL RUBY**, 1917, 2½ h.p., 2-sp., 2-stroke .. £40 0  
**ROYAL RUBY**, 1917, 2½ h.p., single-speed .. £32 10

## SECOND-HANDS.

**ENFIELD**, 6 h.p., Coach Combination, 2-speed, all accessories ..... £48 10  
**HARLEY-DAVIDSON**, 11S Combination, bought new in 1916, fully equipped. .... £75 0  
**MATCHLESS** Model de Luxe, 8B, 7 h.p., dynamo lighting outfit, with hood and screen, luggage grid, speedometer, petrol carrier, Lucas elec. and 21/- Lucas horns, special tool outfit, mirror, backrest, and College mud-shields. This outfit cost over £150, and it was the ambition of the late owner to keep it spotless; one of the finest outfits we have had for many months ..... £117 10  
**MATCHLESS**, 1915-16, 8B, 7 h.p., Comb., Lucas access., child seat on rear, petrol carrier, and luggage grid. Thoroughly fine lot ..... £95 0  
**ENFIELD**, 1916, 6 h.p., dynamo lighting Combination, hood, screen, speedometer, horn; condition very fine .. £110 0  
**ENFIELD**, 1916 (late), 6 h.p. Combination, 3 lamps and horn, mileage under 1,000. Condition indistinguishable from new ..... £98 10  
**ENFIELD** 1915-16 6 h.p. Combination, P.H. lamp, hood, screen, Cowey speedometer ..... £83 10  
**ENFIELD**, 1917, 3 h.p. twin, semi-T.T. model, with sporting Canoelet Sidecar, Stewart warning horn, 2 Lucas lamps, full kit tools, only ridden 3 or 4 times, indistinguishable from new ..... £69 10  
**A.J.S.**, 1915-16, 6 h.p. Combination, 3-sp., kick-start, speedometer, Lucas lamp, luggage grid, watch, windscreen. A perfect outfit ..... £105 0

**151, HIGH STREET, WALTHAMSTOW.**

5 minutes from Hoe Street Station,  
G.E.R.  
'Phone—Walthamstow 169.



## MOTOR CYCLES FOR SALE.

## B.S.A.

**C**OLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798]

**B**.S.A. New 1917 Model K's in stock: £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888]

**B**.S.A., 3½ h.p., free engine, lamps, horn: £35, or near offer.—Harold Smith, 133, Greenway Rd., Run-corn. [X3252]

**F**or Sale, B.S.A. 3½ h.p. motor cycle, with sidecar, in good condition, 2-speed gear.—Moody, Great Ayton. [X3312]

**19**12 B.S.A., 3½ h.p., 2-speed gear box, nice order and condition: £25/10.—8, McDowall Rd., Camberwell Green, S.E. [6151]

**B**.S.A., 1917, brand new, unriden, countershaft model, well equipped; cost £75, sacrifice, £65.—Sinclair, East Molesey. [X3356]

**B**.S.A., 1913, 2-speed countershaft, chain drive, underslung coachbuilt sidecar: £34.—43, Kilmerie Rd., Forest Hill. [6088]

**B**.S.A., 1915-16, with Sunbeam sidecar, 58 gns.; B.S.A., 1913, T.T., 2-speed, clutch, 29 gns.—Troward's, 31 and 78, High St., Hampstead. [5967]

**B**.S.A., 4½ h.p., brand new, in stock, £62; B.S.A., 4½ h.p., late 1915, indistinguishable from new, coachbuilt sidecar: £60.—Percy and Co., 337, Euston Rd., London. [5871]

**B**.S.A., 1916, chain-cum-belt, and Canelet sidecar, tyres perfect, lamps, tools, under 1,000 miles; 63 gns., no offers; 20 gallons of subs. with my bargain.—W. Boffey, Swadlincote. [5696]

**U**NSOILED 1916 4½ h.p. B.S.A., chain drive, new condition, only used about 100 miles; owner going to India: £58; wicker sidecar given in.—Avery, 70, Cobden Rd., Brighton. [X3346]

**B**.S.A. Model K 1916 4½ h.p. Combination, 3 Lucas lamps, horn, speedometer, condition above the average, 1916: £68/10.—Lambie, 151, High St., Waltham-stow, and 50, High Rd., Wood Green. [6008]

**19**16 B.S.A. Model K, special luxurious C.B. sidecar, electric lighting, Binks, mechanical horn, runs on mixture, 2,300 miles, condition perfect: £60; seen any time London district.—Box 1,095, c/o The Motor Cycle. [X3241]

**19**16 B.S.A., chain-belt, 3-speed countershaft gear, 4½ h.p., suitable for sidecar work; price only 46 gns.; undoubtedly the cheapest B.S.A. in England today.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealer in the South. Phone: 1024. [0916]

**4**½ h.p. 1916 B.S.A. and Coachbuilt Sidecar, fitted with hood and screen, spare petrol tank, 3-speed countershaft gear, free engine, and kick starter: £67/10; includes three separate generator lamps, speedometer, warning signal, and Lucas hooter and tools.—Wanchope's, 9, Shoe Lane, London. [6067]

## Calthorpe.

**C**OLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

**C**ALTHORPE Junior, 2½ h.p., nearly new: a genuine bargain, £20.—Hunt, 83, Pasture Rd., Geole. [X3260]

**R**IDER TROWARD'S, 31 and 78, High St., Hampstead, 1915 Calthorpe-Jap, Enfield 2-speed gear; 24 gns. [5969]

**19**15 2½ h.p. Calthorpe-Jap, Enfield countershaft 2-speed gear: £26/10.—Motor Exchange, Horton St., Halifax. [6116]

**C**ALTHORPE-J.A.P., 2½ h.p., Enfield 2-speed, condition as new: £33.—Chapman, Gleurosa, Honey Lane, Waltham Abbey. [5913]

**C**ALTHORPE-J.A.P., 1916, 2½ h.p., Enfield 2-speed, lamps, etc.: £28.—Keen, c/o Mrs. Rush, Terrington St. Clements, King's Lynn, Norfolk. [X3248]

**C**ALTHORPE, 1917, J.A.P., latest model, brand new, Enfield 2-speed, in stock; 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6031]

**C**ALTHORPE, 1917, 2-stroke, Enfield 2-speed, latest model; 33 gns., brand new, in stock.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6032]

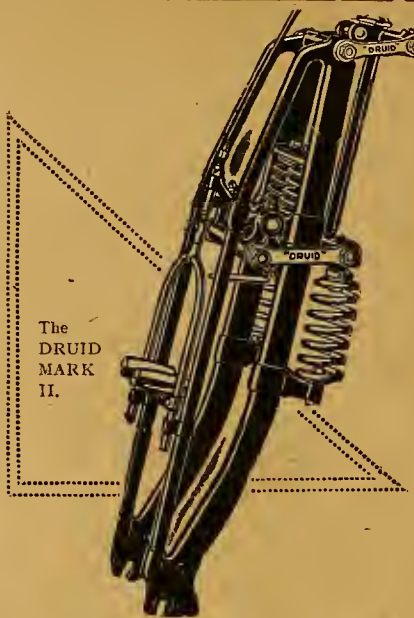
**C**ALTHORPE, 2-stroke, Enfield 2-speed, new, but slightly shop-soiled; special bargain, 31 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6033]

**C**ALTHORPE, 2½ h.p., 2-stroke, brand new, Moseley tyres, Pedley belt; price £28/16 net, or gradual payments arranged.—Juno Works, 248, Bishopsgate, London. [6146]

**19**14 Calthorpe-Precision Junior, 2 speeds, countershaft, tyres, belt, and machine in new condition, mechanically perfect, spares, some petrol: £16.—175, Stockwell Rd., Brixton, S.W. [6085]

**C**ALTHORPE-J.A.P., 1915, 2½ h.p., Enfield countershaft, 2-speed free, excellent order, automatic lubrication, economical; good cycle, lady, gent., part: £25.—Prince of Wales Inn, Windsor. [6185]

**19**16 (November) 2½ h.p. T.T. Calthorpe-Jap, fixed gear, disc wheels, lighting set, Kloxon horn, fully equipped, guaranteed perfect condition and tune, very fast, mileage about 600, tools, spare valve and springs, etc.: £27/10, no offers.—Eastnor, Victoria Rd., New Barnet. [5924]



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BIRMINGHAM.

## MOTOR CYCLES FOR SALE.

## Chater-Lea.

**C**HATER-LEA, 8½ h.p., 1915, chain drive, 3 speed clutch, kick start, with coachbuilt sidecar, complete: £65, or near offer.—Barrett, 2, Albion Rd., Charn, S.W.8. [6]

## Chater-Jap.

**B**EST Reasonable Offer.—8½ h.p. Chater-Jap, 3-speed gear box, clutch, Senspray, all-chain drive, horn, all in very good order.—Parry, Chapel La Chester. [X3]

## Chater-Lea-Jap.

**C**HATER-LEA-J.A.P., 8½ h.p., 2-speed, clutch, 18 gn. sidecar: £35; beautiful running.—Cullen, 18, Nightingale Lane, Clapham, S.W.12. [X3]

**19**14 8½ p. No. 7 Genuine Chater-Lea Combination J.A.P. engine, 3-speed gear box, all spares, including chain, enamelling and plating like new; trial: £38, no offers; after 6 o'clock.—65, Ogham Rd., East Dulwich Station. [6]

## Clyno.

**C**LYNO Combination: £23; engine now down for inspection, reliable lot.—113, Kingston Rd., Wundon. [5]

**19**15 Clyno, 2-speed, 2-stroke, in perfect order, little use: £25.—A., 39, Castlenau Gardens, Barnes. [6]

**C**LYNO 1915 6½ h.p. Coach Combination, detached and spare wheels: £69/10.—Motor Exchange, 1 ton St., Halifax. [6]

**C**LYNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham; Manchester; inclusive price with spare wheel, 100. [6]

**C**LYNO, 1914, 3 speeds, kick-starter, Millford double seated sidecar, all accessories; accept £58; sell through inconvenience; lightweight considered exchange.—Apply, 8.30 p.m., 11, Fernlea, London Hackbridge, Wallington. [6]

## De Dion.

**D**E DION, 2½ h.p., perfect condition: £10.—Fulford, 112, Stroud Green Rd., Finsbury Park. [6]

## Douglas.

**D**OUGLAS, 1915, 4½ h.p., 2 speeds, almost new; £42. [6]

**D**OUGLAS, 1913, 2½ h.p., 2 speeds, almost new: £30.—Percy and Co., 337, Euston Rd., London. [6]

**D**OUGLAS, 1912, 2½ h.p. twin, mag., 2 speeds: £23/10.—1, Elbow St., Wandsworth. [6]

**D**OUGLAS, 1911, 2-speed: £23.—W. and H. M. Co., Ltd., 287, Deansgate, Manchester. [6]

**D**OUGLAS.—Prompt delivery to those on work national importance.—Gibb, Gloucester. [6]

**D**OUGLAS, 2½ h.p., late 1913, T.T., 2-speed, condition, fast: £29.—Barty, Stone St., Gravesend. [6]

**2**½ h.p. Douglas, 1916 War Office Model, 2-speed: £40.—Brown, Stanhope Rd., Stockton-on-Tees. [X2]

**4**½ h.p. Douglas, 2-speed model, fitted with all accessories: £57/10/6.—Wanchope's, 9, Shoe Lane, London. [6]

**D**OUGLAS, 2½ h.p. twin, 1910, just been thoroughly overhauled: £16.—Warreu, Boreham, Chelmsford, Essex. [X2]

**D**OUGLAS, 1914, 2-speed, Phillips pulley: £45.—H. Motor Co., Ltd., 287, Deansgate, Manchester. [6]

**D**OUGLAS 1915 Combination, 4½ h.p., 3 speeds, in horn: £65.—Harold Smith, 133, Greenway, Buncorn. [X2]

**D**OUGLAS, 2½ h.p., 2-speed, with horn, delivered from works May, 1916; 40 gns.—Dr. Crowley, Epsom, Surrey. [X2]

**D**OUGLAS; prompt delivery to farmers, doctors, others doing work of National importance.—Mr. Yeovil. Tel.: 50. [6]

**D**OUGLAS, 1913, 2-speed, Dunlops, in splendid order: £28; lamps and accessories.—22, Adys Rd., Dulwich, S.E.15. [6]

**C**OLMORE Depots, Birmingham, Manchester, Liverpool and Leicester, for earliest delivery Douglas motor cycles. [6]

**D**OUGLAS, 1914, 2 speeds, in perfect order, little used; bargain, £35.—Apply, Edwards, Dunsmore Rd., Stamford Hill, N. [6]

**D**OUGLAS, 1915, 2½ h.p., 2-speed, T.T., complete, lamp, horn, tools, absolutely perfect order; Fenlor, 36, Clarence St., Kingston. [6]

**19**15 Douglas, 2½ h.p., 3-speed, lamps, horn, in excellent condition: £35.—Elec and Co., 1, Bishopsgate Av., Camomile St., E.C.3. [6]

**19**14 Douglas, new Reo, acetylene lighting, electric horn, spare tube, speedometer, good condition: £35/10.—Alpe, 54, Coval Rd., Mortlake. [X2]

**L**ATE 1915 2-speed T.T. Douglas, lamps, horn, spare belt, in perfect order and condition: £42/10, lowest.—2, McDowall Rd., Camberwell G.S.E. [6]



# MOTOR CYCLES FOR SALE.

## Douglas.

2½ h.p. Model U Douglas, 3-speed, footboards, A.V. mag., upturned or semi-T.T. bars, Dunlop condition; £42/10.—Robinson's Garage, t, Cambridge. [6017]

LAS, 2½ h.p., 2 speeds, T.T. model, spare k. Binks, fully equipped, condition nearly new; £40, or nearest offer. Wanted, 4 h.p. Deans, Baldock. [6152]

LAS, 1914, 2½ h.p., 2-speed clutch, kick start, utterly new condition throughout; bargain, £36, sr.—Green, The Mews, Victoria Rd., Northside, Common, S.W.4. [6084]

Douglas, only done 3,000, just thoroughly overhauled and re-enamelled, speedometer, full equip- over size tyres, perfect.—Lieut. Moulds, 39, m Rd., Eltham, S.E. [6176]

R TROWARD'S, 31 and 78, High St., Hamp- id—1911 Douglas, 15 gns.; 1913 Douglas, 2- 9 gns.; 1914 Douglas, 2-speed, 34 gns.; 4 h.p. Douglas, coachbuilt combination, 67 gns. [5970]

LAS, 1911, 2½ h.p., single speed, Bosch mag., belt, footboards, 120 m.p.g., Dunlop back- ont, button tubes, thoroughly overhauled, enamel- ing splendid; £15.—Handcombe, 125, Castle- bury. [X3261]

LAS, 2½ h.p., 2-speed, C.A.V. electrically- ipped, Cowey speedometer, Smith watch, elec-- ulla horns, spares, tools, perfect condition,- nuaie bargain, £32/10, no offers.—Long, 23, St., Woolwich, S.E. [X2955]

Douglas, 2½ h.p., 2-speed, with semi T.T. bars,- tted with Lucas lamp, Watford speedometer, in- y perfect condition; only 43 gns., very great- 7ulians, 84, Broad St., Reading. Biggest light- utor cycle dealer in the South. 'Phone: 1024 [0917]

Douglas, latest model, complete with luxurious- ouchbuilt sidecar, Lucas dynamo lighting set,- igh, speedometer, complete set tools and spares,- ly 2,223 miles, condition as new throughout.—- is, 8, Baboborough Gardens, Goldhawk Rd.,- 's Bush, W. 'Phone: Hammersmith 267. [5595]

Douglas, absolutely new; immediate delivery of- els U. V. W. clutch, kick start, against- uments, for doctors, farmers, war and munici- 1ers, etc. How and where to apply.—For full- rs write to the Douglas Specialists, Robinson's- 1 Green St., Cambridge. Tel.: 388. T.A.: [6018]

## Edmund.

Simply Float on an Edmund.—Oourlay, The- at Douglas Agent, Fallowfield, Manchester. [8012]

## Enfield.

ELD Combinations, latest models; £94/10; de-- 1ry from stock.—Below.

ELD 3 h.p. Twin; £57/10; and 2½ h.p. 2-stroke, 1; delivery from stock.—Exeter Motor Cycle- 1, Bath Rd., Exeter, and Tavistock Rd., Ply- 1. [0838]

ORE Depot, 31, Colmore Row, Birmingham, 1- 1mediate delivery of Enfields. [0801]

ELD, 1917, 3 h.p.; 55 gns.; brand new.—Wil- 1s, Simpson, and Co., 11, Hammersmith Rd., 1. [6029]

ELD 2½ h.p. Twin, chain drive, Bosch mag., 1; £15 or near offer.—152, Camberwell- 1 London. [6187]

ELD, 3 h.p., 1915, perfect condition guaranteed, 1; session; inspection invited; £38.—H. Rowdon, 1, st. Haats. [X3319]

ELD 1914 6 h.p. Combination, wind screen, 1; edometer, lamps, in grand condition; £48.— 1; gh Rd., Leytonstone. [6132]

Enfield, 3 h.p., lamps, horn, speedometer, in 1; xcellent condition; £44.—Elce and Co., 15-16, 1; ete Av., Camomile St., E.C.— [0480]

ELD, 1917, 2-stroke, ridden 150 miles only, 1; up and horn, absolutely as new; £39.—A. 1; e's, Hill Crest, Kingston Hill. [6106]

ELD, 1915, 3 h.p., 2-speed, kick start, lamps, 1; n, tools, under 1,000 miles, practically new; 1; near offer.—14, Chipley St., New Cross, S.E.14. [5946]

ELD (Aug., 1916) Combination, 6 h.p., perfect 1; dition, complete with all lamps, speedometer, 1; y spares; 75 gns.—Hawley, Goodall St., Walsall 1; [X3305]

ELD Combination, late 1916, 6 h.p., J.A.P. 1; ine, speedometer, horn, lamps, accessories, 1; 250 miles; £90.—Write, II., 129, Long Lane, 1; E. [6142]

ELD Combination, late 1913, good condition, 1; y low mileage; £45; Lucas lamps, Klaxon horn; 1; ent.—Charles Tyler, Rosewood, Bickley Crescent, 1; Kent. [5917]

ELD 1917 2-stroke, £44/2, brand new. We are 1; eld specialists. Both models in stock; im- 1; edelivery.—Wilkins, Simpson, and Co., 11, Hamp- 1; Rd., London. [6030]

L Enfield Combination, 1913, 6 h.p., coachbuilt 1; seat, complete with 3 lamps, horn, speedometer, 1; y, first-class condition; £45, lowest.—S. Brooke, 1; eie St., Deighton, Huddersfield. [X3347]

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A BOX OF STANLEY SPARES is a complete belt equipment outfit—the best and cheapest insurance you can effect against belt trouble on the road. It contains:



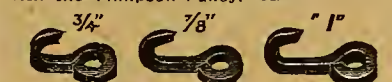
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SEE ELITE RUBBER CO. LTD.'S Column Advertisement in this issue for SPECIAL BARGAINS in TYRES.

# MOTOR CYCLES FOR SALE.

## Enfield.

ENFIELD 6 h.p. Combination, De Luxe Model, Lucas dynamo lighting set, wind screen, hood, speedometer, only done 4,000 miles, in splendid condition; £80, or nearest offer.—Beaven, Glenwood, Granville Rd., North Finchley. [5905]

RIDER TROWARD'S, 31 and 78, High St., Hamp- stead.—1916 Enfield, 2-speed, 2-strokes, 29 gns.; 1915 Enfield, 3 h.p., 2-speed, 32 gns.; 1916 Enfield stand- ard combination, perfect, 82 gns.; 1917 Enfield stand- ard combination, indistinguishable from new, 86 gns. [5971]

ENFIELDS Actually in stock—1916 6 h.p. dynamo lighting combination, hood, screen, speedometer, and horn, condition very fine, £110; also a 1916 (late) 6 h.p. combination, 3 lamps, horn, mileage under 1,000, the condition indistinguishable from new, £98/10; also a 1915-16 6 h.p. Enfield combination, P.H. lamp, hood, screen, Cowey speedometer, £89/10; also 1917 3 h.p. 2-speed twin, semi T.T. Model, with sporting Canoelet sidecar, 2 Lucas lamps, Stewart warner, full kit tools, machine only ridden 3 or 4 times, indistinguishable from new, £69/10.—Lamb's, below.

BRAND New Enfields actually here.—A 1917 6 h.p. 2-speed outfit, £115; also a 1917 2½ h.p. 2-speed 2-stroke, £44/2.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. 'Phones: 169 Walthamstow, and 1956 Housney. [6001]

## Excelsior.

EXCELSIOR, magneto model, new and unused; £75.—Griffin's, 89, Gt. Portland St., W.1. [6016]

3½ h.p. Excelsior, B. and B., Druid forks, Bosch mag., good tyres and belt, semi bars; first cheque £13 secures.—F. Davy, 61, Edward St., Nelson, Lancs. [X3222]

1916 American Excelsior Combination, 3-speed, kick starter, dynamo lighting model, excellent condition; £65, or exchange.—136, Lavenham Rd., Wandsworth, S.W.18. [6172]

EXCELSIORS.—All models in stock; magneto model £75, electric lighting model £85; get a big X. You'll be satisfied.—Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester. [X1462]

EXCELSIOR (American) Combination, 7-9 h.p., December, 1915, 3-speed, Binks 3-jet, new Dunlops, speedometer, numerous spares, £25 coach sidecar, child's seat, new condition throughout; £77/10; seen 10 to 6.—Russell, 27, Store St., W.C.1. [6077]

THE Good Old X, Standard Model, 7 h.p., 3-speed American Excelsior, £75; De Luxe models, with dynamo lighting outfit and speedometer, £85; special sidecars to match, £15 and £19; immediate delivery from stock of a limited number; every machine specially tuned and adjusted before delivery.—The Premier Motor Co., Aston Rd., Birmingham. [5949]

## F.N.

F.N., 7 h.p., and coachbuilt sidecar, in good condition; price £35.—64, Pages Walk, Bermondsey. [6336]

F.N. (late), 5-6 h.p., 4-cyl. mag., new tyres; £15/10.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [6102]

RIDER TROWARD'S, 31 and 78, High St., Hamp- stead.—F.N., 1913, 2½ h.p., 2-speed, clutch, 34 gns.; F.N., 5 h.p., 4-cyl., 12 gns. [5972]

## Grandex.

1916 2½ h.p. Grandex Lightweight, Precision, 2-speed and free. Bosch, new condition; £18/10.—65, Griffiths Rd., Wimbledon. [5947]

## Harley-Davidson.

1915 Harley-Davidson Combination, £59; 1916 ditto, £80.—Clapham Motors, King George St., Greenwich. [X3353]

1916 Harley-Davidson Combination, 7-9 h.p., 3-speed, electric light, horn, in good condition; £85.—Below.

1916 Harley-Davidson Combination, 7-9 h.p., 3-speed, lamps, horn, in very nice condition; £89.—Below.

1915 Harley-Davidson Combination, 7-9 h.p., 3-speed, lamps, horn, in splendid condition throughout; £65.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0491]

HARLEY-DAVIDSON 118 Combination, bought new 1916, fully equipped; £75.—D. O. Lamb, 151, High St., Walthamstow. [6208]

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802]

1915 Harley-Davidson Combination, in tip-top condition, mag. model, lamps, etc., small mileage; £70.—M., 14, Gladsmuir Rd., Highgate, N.19. [6206]

1916 Harley-Davidson Combination, magneto model, accessories, perfect condition; bargain, 75 gns.—Smith, 15, Rupert St., Leicester Sq., London. [6091]

HARLEY-DAVIDSON 1915 Combination, done 3,000 miles, Bosch, car lighting set, excellent condition, spares; £65.—Newman, 81, Walhouse St., Walsall. [X3306]

HARLEY-DAVIDSON, 1915, 7-9 h.p., 3-speed combination, splendid condition, tyres new, all accessories; £60—4, Criterion Buildings, Windows Bridge, Thames Ditton. [6025]



## MOTOR CYCLES FOR SALE.

## Harley-Davidson.

**HARLEY-DAVIDSON**, 1917 electric model, hardly used; sell £119, or exchange Douglas 2½ h.p. and cash; letters only.—G.H.E., 38, Chambers Lane, Willesden Green, London. [X3308]

**HARLEY-DAVIDSON** (late 1915), little used combination, hood, screen, spare tyres, chains, speedometer, petrol, consider late Douglas part; £68 cash.—20, Stanhope Rd., Sidcup, Kent. [6191]

**HARLEY-DAVIDSON**, 1916, electric model, underslung Bramble sidcar, same colour, hood and screen, tyres good, all spares and extras, condition perfect; £95.—Alpe, 54, Coval Rd., Mortlake. [X3255]

**RIDER TROWARD'S**, 31 and 78, High St., Hampstead.—1916 Harley-Davidson combination, dynamo lighting, 86 gns.; 1916 Harley-Davidson combination, standard, 82 gns.; 1915 Harley-Davidson combination, dynamo lighting, 69 gns.; 1915 Harley-Davidson combination, standard, 65 gns. [5974]

**HARLEY-DAVIDSON**, 17F, 7-9 h.p. Swan combination, hidden approximately 100 miles only, absolutely as new, £120; also 1915 7-9 h.p. J Model and sidcar, electric equipped, all tyres as new and unpunctured, a very creditable outfit, £75.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6006]

## Henderson.

**HENDERSON**, 1913, 4-cyl. clutch, case sidcar, hood and screen, perfect condition; £50.—51, High Rd., East Finchley, London, N.2. [5998]

## Hobart.

**RIDER TROWARD'S**, 31 and 78, High St., Hampstead.—1916 Hobart, 2-speed, 2-stroke; 25 gns. [5975]

## Humber.

**HUMBER** Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

**HUMBER**, 1912 model, 3½ h.p., 2-speed; £15.—Haines, 169, Lower Clapton Rd., N.E. [X3294]

**31 h.p.** Magneto Humber, spring forks, belt drive; £14/10.—Motor Exchange, Horton St., Halifax. [6117]

**1914 3½ h.p.** 3-speed Humber, lamp, etc.; £35: cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863]

**RIDER TROWARD'S**, 31 and 78, High St., Hampstead.—Humber, 1913, 3½ h.p., 2-speed, clutch; 23 gns. [5973]

**HUMBER**, 3½ h.p., 2-speed, new tyres, engine and gears in perfect order; £13/10.—Howe, High St., Nuneaton. [X3194]

## Indian.

**INDIAN**, 1915, 3½ h.p., 3-speed, splendid condition; £40.—127, Clapham Park Rd., S.W. [5912]

**INDIAN**, 7-9 h.p., 2-speed, with Montgomery sidcar, splendid condition; £39.—31, Trafalgar Rd., Wigan. [X2927]

**1912 4 h.p.** Single-cyl. Indian, 2 speeds, free engine; £25/10.—Motor Exchange, Horton St., Halifax. [6118]

**7-9 h.p.** Indian, 1912, clutch model, 2 lamps, kick starter; £28.—10, Norwood Crescent, Southampton. [X3272]

**INDIAN**, 6 h.p., 1914, clutch model, going Overseas, must sell; £27, no offers.—Box L4, 156, c/o The Motor Cycle. [6058]

**INDIAN**, 7-9 h.p., 2-speed, spring frame, late model, first-class condition; £54.—Haines, 169, Lower Clapton Rd., N.E. [X3291]

**7-9 h.p.** Indian, 1916 clutch model, in condition like new, complete with all accessories; £55.—Wanchope's, 9, Shoe Lane, London. [6075]

**INDIAN**, late 1915, 7-9 h.p., 3-speed, kick-start, Indian Heedee sidcar, in grand condition; 55 gns.—785, High Rd., Leytonstone. [6133]

**INDIAN**, 1915, 7-9 h.p., standard combination, spring frame, electric equipment, lovely turnout; £65.—51, Mapletorpe Rd., Thornton Heath, S.E. [6196]

**INDIAN**, 1915, 7-9 h.p., in nice condition, £42; Indian, 1915, 5 h.p., equals new, 3 speeds, £45.—Percy and Co., 337, Euston Rd., London. [5865]

**INDIAN**, 1915, 7 h.p. De Luxe Model, spring frame, countershaft 3-speed, kick starter, electric lamps and horn, coachbuilt sidcar, combination new August, 1915, and had little use, perfect condition; £70.—The Premier Motor Co., Astor Rd., Birmingham. [5950]

**1914 Indian** Spring Frame Combination, 7 h.p., 2-speed, clutch, kick, speedometer, electrically equipped, 30 gns. Canoelet sidcar, new spare tyre, tools, beautiful turnout, unused for 18 months, only done 4,800 miles; £50, offers.—55, Bulstrode Rd., Honeypot. [6080]

**RIDER TROWARD'S**, 31 and 78, High St., Hampstead.—1915 Indian, 7-9 h.p., 3-speed, clutch, kick start, electric lighting, 49 gns.; 1915 T.T. 7-9 h.p. clutch model Indian, 39 gns.; 1914 7-9 h.p. Indian, 2-speed, clutch, spring frame, 35 gns.; 1911 Indian, 5 h.p. twin, 17 gns. [5976]

**INDIAN**, 1915-16, 5 h.p., 3-speed combination, with accessories, tyres unpunctured, enamel uns scratched, semi T.T. bars, very pleasing outfit, £68/10; also 1915-16 7-9 h.p. clutch model, T.T. bars, disc wheels with lamps, horn, and large exhaust whistle, condition equal to new, hidden approximately 1,500 miles, £55.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6007]

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## MOTOR CYCLES FOR SALE.

## Ivy.

**IVY**, 1915, 2-stroke, in fine order; £18/10.—The W. Hall Garage, Walsall. [X30]

**IVY**, 2-stroke, 2½ h.p., 1915, good tyres, fully equipped as new throughout; £23.—Advertiser, 156, Portland St., W.1. [39]

## James.

**41 h.p.** James, 3-speed clutch, Dunlops, good condition; £30.—Hutton, Kineton, Warwick. [X30]

**COLMORE** Depot, 261, Deansgate, Manchester, in stock complete range of James motor cycles. [0]

**JAMES**, 1915, 2-stroke, 2-speed countershaft, lamp, etc., with 4 gallons petrol; £25.—194, Storky Rd., S.W. [60]

**1917 James** 2-stroke, 2 speeds, in absolute new condition, done 200-miles, complete; £28.—Effingham Sq., Rotherham. [X30]

**JAMES** 1916 Combination, 4½ h.p., practically as done 250 miles; £70; appointment.—Elsie V. Lansdowne Av., Leigh-on-Sea. [61]

**JAMES** 1914 Combination, 4½ h.p., 3-speed coach, clutch, kick start, excellent condition; 1—Griffin's, 89, Gt. Portland St., W.1. [61]

**1913 James**, waterproof Bosch, chain drive, coach shaft 2-speed gear, and coach sidcar, body in new; £36/10.—Motor Exchange, Horton St., Halifax. [6]

**JAMES**, 1914, 4½ h.p. (S.A. 3-speed hub), Camo sidcar, coachbuilt, screen, and lamps; owner away 2½ years; £50.—Box 1,093, c/o The Motor Cycle. [X30]

**JAMES**, 4½ h.p., solo, purchased new December, 1917, run 1,000 miles, practically new condition, 3-speed clutch, kick starter; £55.—Mack, 11, Esplanade, L. tort. [5]

**JAMES** Actually on premises.—1917 3½ h.p. twin speed solo, £69/10; also 1917 4½ h.p. No. 1 speed combination, £87/2.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6]

**FOR** Sale, motor bicycle and sidcar, James combination, 4½ h.p., condition as new, special silver storm apron, etc.; £65, with all accessories.—Write appointment, 284, Sales Advertising Offices, Fleet E.C.4. [6]

**RIDER TROWARD'S**, 31 and 78, High St., Hampstead.—James, new models in stock, 4½ h.p. single, 3-speed, £69/10; 3½ h.p. twin, 3-speed, £69/10; 1915 3½ h.p. twin James combination, 52 gns.; 4½ h.p. James, 3-speed, 37 gns. [6]

## J.A.P.

**IMPERIAL J.A.P.**, 1916, 2½ h.p., 2 speeds, new condition throughout; 29 gns.—Stevens, Tork. York. [X30]

**6 h.p.** J.A.P. Rex-Jap, complete with coachbuilt car, 2-speed gear, spring seat, in splendid condition; £60.—Turpin, 29, Preston Rd., Brighton. [6]

**1915 4 h.p.** J.A.P., overhead valves, T.T. bars, Palmer tyres, horn, lamp, and accessories, Dunlop belt; too fast for owner; £25, or exchange lightweight.—45, Bow Common Lane, E. [6]

## Lea-Francis.

**LEA-FRANCIS** 1916 Combination, twin, 3-4 countershaft, Bosch, lamps, Watford speedometer trial; £55.—Norman, 26, All Saint's Green, W.1. [X30]

## Lugton.

**LUGTON**, 3½ h.p., B.S.A. 2-speed, in new condition only used a few times; £30, or bargain.—Haines, 169, Lower Clapton Rd., N.E. [X30]

## Levis.

**LEVIS**, 2½ h.p., new condition, 1916; price £27.—High St., Rugby. [X30]

**1915 Levis**, accessories, almost new; £20.—Swan, Drayton, Middlesex. [X30]

**LEVIS**, 2 speeds, in real good condition; £2.—Percy and Co., 337, Euston Rd., London. [6]

**COLMORE** Depots, Birmingham and Leicester, delivery of all models of Levis motor cycles in stock. [0]

**LEVIS** 1917 Popular, latest model, brand new; —Wilkins, Simpson, and Co., 11, Hammer Rd., London. [X30]

**1915 Levis** 2-stroke, good condition, new mechanical horn; £17/10.—436, White Rd., Thornton Heath. [6]

**LEVIS**, 1915, 2-speed, 2½ h.p., good condition, £17 with cash for 3½ h.p. with 3-speed gear, Cleveland Rd., Hornsey, N.8. [6]

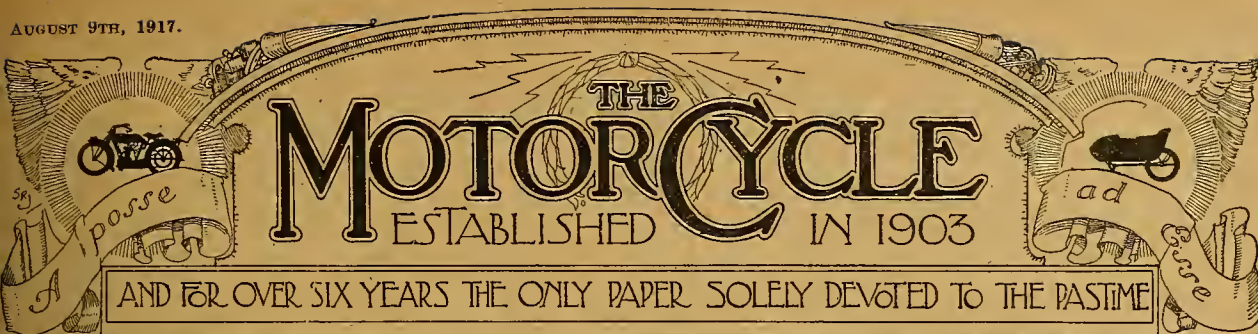
**LEVIS**, 1917, 2½ h.p., 2-speed Model E, £47/10; 1917 2½ h.p. No. 1 Model, single-speed, £3.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6]

**LEVIS**, 2½ h.p., 1916, 2-stroke, large P. and H. lamp, generator, rear lamp, mechanical feeder cyclometer, condition as new throughout; Advertiser, 156, Gt. Portland St., W.1. [6]

## Lincoln-Elk.

**31 h.p.** Lincoln-Elk, Bosch, splendid condition; £32.—50, Homestead Rd., Fulham. [6]





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PARIS—Smith's English Library, 249 Rue Rivoli.

**Petrol Permits.**

**M**OTOR cyclists by now are so well used to continuous thwacks from every quarter, and so impervious and docile have they become, that the majority will view the notice to holders of petrol licences with equanimity. Although it would be absurd to question the policy of this reviewing of all licences at the expiration of September, and of taking every precaution to conserve and stop all wastage of petrol, the Order comes heavily on those who, instead of hoarding month by month their supply, relied on being able to obtain at any future date the petrol on which they had paid their tax.

The notice says: "Full duty motor spirit licences of the *current* series are available for private motor cars during the period of May to October inclusive, and for private motor cycles during the period April to September."

The obvious inference is that after September no licence will be issued without strict enquiry as to the assertions respecting its use. Many current licences have been issued to people who made false claims, and had no legitimate reason for using petrol. Many business men have suffered extreme inconvenience through the small allotment granted them. The latter class have had full cause to grumble when they have seen petrol wasted on what were obviously pure pleasure rides.

The abuse levelled at the late Petrol Control Committee we do not think quite justifiable, although individuals may have full cause for complaint. The difficulty of the committee was in separating the genuine appeals from the spurious, and the new Controller will have precisely the same difficulty to contend with when it comes to issuing the new licences in October. We hope the small business man's claim will receive attention, for, as we have just stated, he appears to be the one who has suffered most in the allocation of petrol licences. It has not been unjust distribution, but stereotyped

methods of awards that have been the fault in the past, some owners being surprised at the committee's liberality and others at its meagre allowance.

**Other Fuels.**

Motorists have naturally turned their thoughts to the production of gases other than petrol vapour. We have heard of numerous experiments with acetylene, but these have not developed as the enthusiast would have liked. We have answered scores of letters from correspondents who ask, "Why cannot acetylene gas be used effectively in internal combustion engines?" Coal gas, of course, has been tried many times, and is being used successfully by car owners whose journeyings are in a prescribed area, bags holding half-compressed or uncompressed gas being used instead of heavy cylinders holding gas in a compressed state. In one case the space required for the gas bag debars its use on motor cycles, and in the other the great weight of the iron cylinders and the difficulty of charging and compressing would be the deterrent. The fact that coal gas would give less power is a drawback which would not alone prevent its use. Obviously, if it is not adaptable for general use on cars, motor cyclists need not look for developments in that quarter. Electricity, for the present, is impracticable, for obvious reasons; also, it would necessitate a different type of machine, as would the use of steam. There seems to be no hope whatever of a fuel being procurable in any quantity on which a tax has not to be paid. Alcohol produced from potatoes is spoken of as a probable solution, but obviously the product, if procurable—which, of course, it is not—would be liable to taxation.

It is easy to talk of the various fuels expected to be marketed after the war, but it does not solve the difficulties of the anxious rider who may have exceptionally justifiable reasons for using a motor cycle, but who cannot persuade the Petrol Controller to send him the welcome yellow folder.



## Another Throttle-controlled Pump.

### LUBRICATION IN PROPORTION TO SPEED AND LOAD.

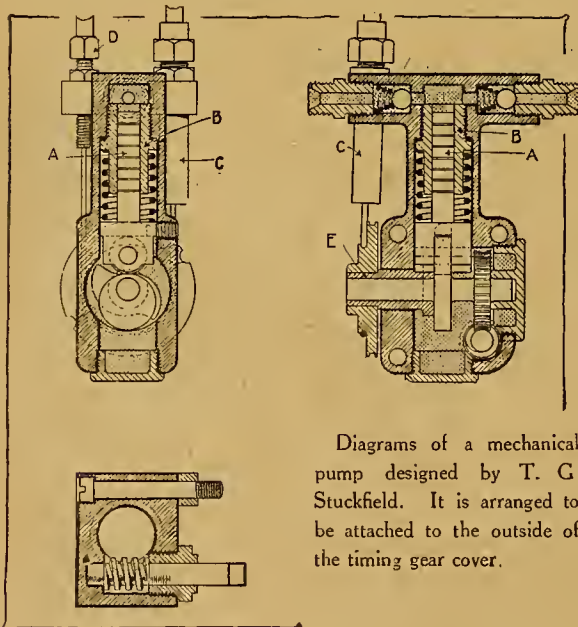
**W**E illustrate on this page another very ingenious oil pump designed to supply the engine with oil varying in amount with the speed and throttle opening. Moreover, the supply of oil over the whole range can be set to suit different conditions. The inventor, Mr. T. G. Stuckfield, describes the pump as follows:

In view of the interest taken by *The Motor Cycle* and its readers in mechanical oil pumps, in which the supply of oil to the engine is controlled in relation to the load in addition to the speed, I am sending a drawing of such a pump, small in size, easily made, entirely self-contained, and requiring the minimum of alteration to the engine.

As can be seen from the drawing, the pump is attached to the outside of the timing gear cover by means of the three screws for which holes are drilled and tapped in the cover, and another hole is drilled through the bush of one of the 2 to 1 wheels, through which hole is passed the projecting end of the worm spindle, the flattened end of which engages in a slot in the end of the spindle of the timing wheel, thus driving the worm at half the speed of the engine.

This worm rotates the worm wheel, which is machined out of the solid bar complete with spindle and eccentric; the chamber containing the worm wheel and eccentric is closed by a screwed bush which acts as a bearing for the spindle. As the eccentric revolves it forces the plunger upward on its delivery stroke, acting on the anti-friction roller carried by the slotted circular enlarged end of the plunger; this enlarged end also forms a guide block working in the bored portion of the pump casing.

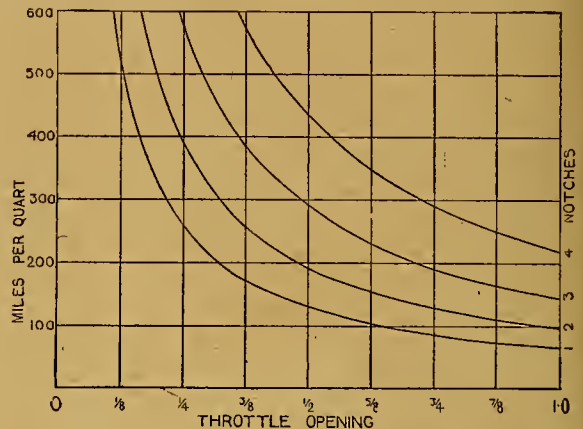
The pumping portion A works in a separate barrel B screwed into the casing, the joint being made by a washer under the shoulder as shown. This barrel is made of steel, hardened and ground in the bore.



Diagrams of a mechanical pump designed by T. G. Stuckfield. It is arranged to be attached to the outside of the timing gear cover.

The return or downward stroke of the plunger is made by means of a spring.

The ball valves and pipes are all carried by the T-shaped end of the pump casing; the delivery branch also carries two arms, which serve to carry the Bowden wire passing to the throttle valve from the throttle



Graph of oil consumption at various throttle openings.

lever, the wire from lever on handle-bar passing first through the spring box C, thence round the grooved double control wheel, thence through the adjuster D, and so on to the throttle valve.

#### Four Settings.

It will be obvious that as the throttle valve is opened these double wheels will be rotated through an arc equivalent to the amount of throttle valve opening, and when the lever on the handle-bar is moved to close the throttle valve, the spring contained in the box C will rotate the double wheels in the opposite direction.

Since the length of the arc through which the wheels are rotated is equivalent to the throttle valve opening, the angle will be less when the nipple engages the larger wheel in inverse proportion to the diameters of the two wheels. The double wheels are secured to a sleeve E concentric with the spindle; at the inside end of this sleeve two cams are formed, these cams having different contours and forming the stroke regulating mechanism of the pump, since they prevent the pump plunger coming back a distance, which varies as the cams are moved simultaneously with the movement of the throttle valve. When once set for any particular engine this need not be altered.

Changing the position of the nipple from notch to notch raises the mileage per quart 50%. This variation of mileage with each particular notch in use and with each variation of throttle opening is, perhaps, better shown by the graph on this page.

As was pointed out before, the pump is small, the overall dimensions of the body being  $3\frac{1}{2}$  in. high,  $2\frac{1}{2}$  in. over the arms, and  $1\frac{1}{2}$  in. wide over the Bowden wire arms; it is entirely self-contained, and requires no cover whatever, and the whole of the work, with the possible exception of the worm wheel teeth, can be done on a small screw-cutting lathe.



# Occasional Comments by "Ixion"



## Hitting a Dog.

I SAW a good man and true very completely knocked out by a very small dog last week. It happened much as usual. The motor cyclist was purring quietly along at about 18 m.p.h. down a main road on the outskirts of a large town. An Aberdeen terrier was proceeding sedately along the pavement in the wake of his mistress's skirts, musing on the chances of the cold beef turning out for supper when he spied a lady friend in company with a mongrel on the opposite pavement. He turned sharp right, accelerated to about 50 m.p.h., and caused the motor cyclist to hit the stone setts with his forehead about ten yards ahead. This casualty, let it be plainly stated, was of the avoidable order. I am no believer in the yarns of those riders who boast that they have motored since the year one and have never killed so much as a spring chicken. I have motored for a mileage which is rapidly approaching the quarter million mark, and I confess frankly that I have slaughtered many dogs, cats, chickens, and rabbits, and, without being in the least brutal or callous, I expect to slaughter many more.

## The Lesser and Greater Evils.

SO long as our roads form at once a public playground for birds and animals devoid of common-sense, and for human beings so young or so stupid as to be deficient in commonsense: and these same roads also serve as paths for comparatively rapid locomotion, collisions must be of frequent occurrence. Some day traffic objects of an irrational or careless character will be as scrupulously forced off our motorways as they are already excluded from our railroads, but that day is not yet. In the meantime, it is the duty of the motorist, whose wits are almost invariably the most quick-acting of the parties involved, to decide who shall bear the brunt of a dangerous position. The cardinal rule is that we must always sacrifice ourselves rather than injure other humans, and to our credit we uniformly obey this fundamental principle even when the blame rests wholly on the shoulders of the other party. There is probably not a motorist in the country who would not turn his machine into a stone wall rather than ram a fanatic at large, or drive over a drunkard asleep on the road at night. The second rule is that it is better to kill a domestic animal than to die oneself, or to risk serious injury oneself. After this preface I may proceed to expound the art of emerging scathless from a collision with a small animal.

## Hit it Full.

THE unfortunate rider above mentioned tried to dodge the murderous Aberdeen up to the very moment of impact. He steered this way and that, the frightened dog countering every movement with a fresh swerve. At the last he lost his head; his front wheel hit the animal's hindquarters, and I

am not at all sure that the rider had not let go his handle-bars when the collision occurred; at any rate, his wrists were not taut. His front wheel swung round at right angles to the rear wheel: the machine collapsed in a heap: the rider was flung yards over his handle-bar, and fell on his head in the road. There was no need for this. The instant he perceived his danger he should have tensed his wrists into steel cables and held his front wheel masterfully and irresistibly true in the line along which he was advancing; the dog should have been left to attempt the dodging, and would probably have done it successfully, for if dogs are not logical, they have quick instincts and profound fears. But, supposing the dog had held to its course, precisely, at right angles to the motor cycle's track, the motor cyclist would have gone clean over it, and in all probability neither of them would have been seriously hurt. The motor cyclist would merely have had to regain control after a bump, and possibly a wobble. The dog would not have been cut or wounded, though its back might have been broken. As it was, the rider was seriously injured, and the dog had to be destroyed.

## The Art of Colliding.

IN brief, then, quite large animals, even retrievers, can be safely rammed in emergencies, provided the steering wheel is held dead on its course by strong wrists. It is a big dog which weighs 50 lb. or stands more than eighteen inches high. The cycle and rider represent a mass of perhaps 500 lb. striking at right angles at perhaps 20 m.p.h. The first result of the impact is to throw the animal over on its side, when the height of the obstacle to be surmounted shrinks in a thousandth of a second from perhaps 18 in. to 6 in. Over this the machine will roll without danger if the wheel is held on its course firmly: and even poor doggie will often be only temporarily the worse. If any steering at all be permissible, the rider should aim at the middle of poor doggie's back. But it is probably sounder practice to concentrate on steering dead straight ahead.

## Bending Footrests Down.

I RECENTLY referred to the fact that on some machines the footrests are apt to foul the ground when the rider is cornering at speed. A Yorkshire rider forwards a T.T. tip which he has found useful in his pleasure riding. There are two methods of dealing with the trouble, one of which is to bend the outer tips of the rests up. It helps to keep the feet on the rests, and gives a purchase for the boot, and a slight upward turn will prevent the fouling, which is never more than slight. If this plan be objected to on the ground that the right and left hand rests are usually assembled by threading on a single spindle, the best method is to shorten the rests by an inch or so, which makes an astonishing margin between fouling and not fouling the road.



# MORGAN



Descending from Buttermere Hause on the way to Honister Crag.

## THE FIRST CYCLE CAR TO CLIMB HONISTER PASS FROM BUTTERMERE.

BY GEORGE D. ABRAHAM.

(Author of "The Complete Mountaineer," "Motor Ways in Lakeland," "Mountain Adventures at Home and Abroad," etc., etc.)

NOT long ago the story in *The Light Car* of a remarkable record ascent of Honister Pass from both sides by a little Swift coupé, standard in every respect, roused considerable attention. Several attempted the same performance, but with scanty success. Gruff old Honister handled all very roughly, until at last a David arose in the form of a little Morgan. In the writer's opinion, this seemed scarcely a likely conqueror, for friends who in pre-war days owned these mounts had never seemed keen on trying their machines on real motor-mountaineering. Thus an invitation to join in an attack on Honister from Buttermere was accepted gladly.

A young Danish enthusiast, Mr. Neils Svansø, was the owner of the Morgan. His stories of hill conquests in other districts made one almost apologise for having nothing better than Honister Pass close at hand. The quiet air of the lower dales echoed with the names of Litton Slack, Cowdale, and innumerable other "pimples" as we sped westward from Keswick, bound for Buttermere by the Vale of Newlands and Buttermere Hause. There was no mistaking the extreme efficiency of the Grand Prix model. With three lusty passengers and a very important member of the party in the form of a heavy camera

outfit aboard, it was no light undertaking to tackle at the outset one of the toughest mountain roads in Cumberland.

### The Charms of a Bob-sleigh.

The little machine carried us up to the heights and slid us down to the depths of the dales with fascinating ease and smoothness. Those wonderful downhill glides on the low-seated outfit recalled the charms of a bob-sleigh or toboggan run, and instinctively one swung to the balance on the curves.

The hardened "Morganites" were amused at the tendency, and with the crush aboard their places on the machine were sometimes in jeopardy. Apparently there was no need to "swing" with the Morgan, even on the sharpest curves taken swiftly. But as we sped down from the sunny heights into the larchy shades under the huge towering mass of Causey Pike, the sight of the Devil's Elbow recalled memories of a certain rashly-driven Morgan which capsized recently on the notorious hairpin. The writer warily suggested that an interesting photograph should be taken, and from the solid mountain side it was a revelation to see the present machine and driver rush the tricky hill so splendidly. With the two standard gears fitted



**Mountaineering on a Morgan.**

— $4\frac{1}{2}$  to 1 and  $7\frac{3}{4}$  to 1—this was no mean performance. The writer's want of confidence totally disappeared.

**In the Vale of Buttermere.**

Then with all aboard there came the delightful dash skywards 'midst the bracken heights, until the forbidding scarp of Newlands Hause rose ahead. There was now no photographic excuse. The little machine fairly prang at the opposing slope, leaping, bumping, and skidding on the treacherous shale, but always under sure and skilful hold.

Surely never was the pass seen so speedily climbed; the summit seemed no sooner in view than it was attained. After another photographic halt, we were soon sliding carefully down into the Vale of Buttermere, amidst all the grandeur of rugged mountains and beauty of blue lakes set in an emerald underworld. It was good to have companions who realised the unique and varied beauty of this corner of Lakeland, so unlike an unappreciative Lancashire tourist at Windermere, who said bluntly, "When tha's seen half a mile on't tha's seen t'lot."

**On Honister Pass.**

Then came the engrossing run along the lake shore, with Honister Crag looming ahead just as grandly as in the peaceful times when throngs of enthusiasts now crowding far distant trenches came to try their luck and pluck on the most famous of English hills. Unlike those days, there now arose no strident note from behind to hurry us to speedier ravel mountainwards. Yet once the actual climbing

began there was no holding back the machine. The lower part of the pass was tackled with remarkable ease, and the writer, now alone and afoot, walked up the slope rather doubting whether Honister would retain its reputation in the face of the dashing Morgan. They were out of sight, but far overhead the noise of the lusty engine echoed persistently in the huge

crag. Surely the fearsome gradient of Hill Step—the crux of the climb—could not be ascended at the first attempt.

The noise continued until the view of the upper part of the pass was revealed, and there was a certain satisfaction in seeing far above the mid-way bridge a tiny black speck almost hidden in blue smoke roaring furiously but absolutely still. The Morgan had stuck on a steep, stony, 1 in  $3\frac{1}{2}$

gradient about fifty yards below Hill Step. Even this was a very astonishing climb considering the fact that no rope or chain had been used on the driving wheel. The special, sturdy, Stepney road-grip tyre had behaved excellently, and now its grip was augmented by a rope bound round the driving wheel. An excellent restart was made despite the extreme steepness, but unfortunately the unsuitability of the Morgan driving wheel for any non-skid attachment was quickly revealed. There was a crash from below, and a "dash" from the driver—the low gear driving chain had broken on account of its entanglement with the rope. Luckily a spare chain was carried.

**"Over the Top."**

Despite an annoying surfeit of links, as well as a lack of proper tools, the new part was made the correct length to be eventually fitted, and the grimy



(Top) The first cycle car over the crest of Hill Top, above the most difficult bit of the pass. The road is seen winding valleywards over 500 feet below.

(Bottom) A tough struggle up the 1 in  $3\frac{1}{2}$  gradient below Hill Step, the crux of the climb. Observe the rough sliding rock-strewn surface.



### Mountaineering on a Morgan.—

operators restored to the semblance of white men once more. Then ensued the final struggle which made the driver forget all other hills. Honister upheld its reputation. Machine and driver stuck to their work



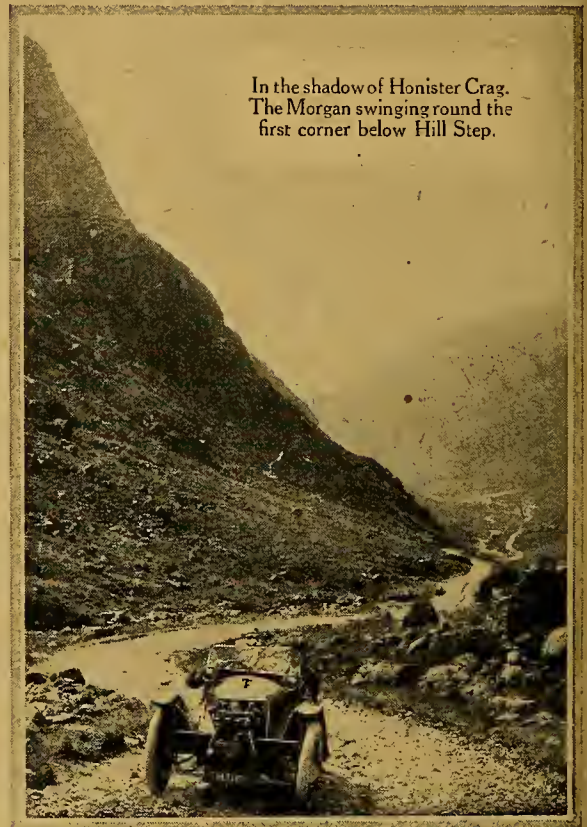
By the shore of Buttermere, with Honister Crag looming grandly in the distance on the left.

bravely, and despite the wildly whirling driving wheel, which even the weight of two extra passengers failed to stay from slipping perpetually, the rugged slope was gradually overcome. Loose stones were flung all round, and it was positively dangerous to approach the tail of the machine.

There was an ominous smell of burning rubber, and when the crest of Hill Step was topped we found the corrugations of the driving tyre had disappeared. Still, the driver was delighted; in his opinion the success was worth many new tyres. On the upper part there was much jubilation and photography, but the photographer of the party discovered a serious trouble. A valuable lens had been left behind somewhere earlier in the day. Thus instead of finishing the day's run on the eastward side of the pass to Borrowdale, the backward journey was made by the morning's route.

The return to the hotel gave momentary satisfaction to those who had previously prophesied our failure on

Honister, but there were no sceptics, and had there been, the camera held proof of the successful achievement. That wonderful homeward bound rush up Buttermere House was certainly well worth the *détour*, the more so as the lost property was safely recovered from the top of a wall where it had lain all day. The Morgan had proved its powers and efficiency in astonishing fashion, but those who repeat the adventure would do well to use the lowest gear available, viz., 11½ to 1. With the capital independent chain system for each gear, this could be easily done without spoiling the fast long-distance running of the



In the shadow of Honister Crag. The Morgan swinging round the first corner below Hill Step.

machine. On gradients approaching 1 in 3 the carburettor was so placed that it failed to provide full power to the excellent engine, but with a good supply of petrol in the tank this drawback would scarcely occur. There was no overheating, and the writer looks forward with pleasure to further exciting hill conquests on the Grand Prix Morgan when normal times return.

### PETROL FOR MINERS.

A NUMBER of applicants for assistance in obtaining petrol licences have been received by the Auto Cycle Union from miners and other workers at coal mines. They were originally referred to the Ministry of Munitions for the necessary recommendation, but no sympathy could be obtained from that department. The Union, therefore, approached the Controller of Coal Mines at the Board of Trade,

who promptly recognised the advisability of helping those colliers who, although owning motor cycles, are now compelled, owing to their being unable to secure supplies of petrol, to walk long distances to the coal mines. The necessary particulars of each individual case have to be furnished on a form which can be had on application to the Secretary, Auto Cycle Union, 83 Pall Mall, S.W.1.



## MILITARY NOTES.



MOTOR CYCLISTS OF THE TRANSPORT SECTION.

A group of A.S.C., M.T., men who have been out in France since 1914. Reading from left to right: Pte. Dodsforth, Cpl. Carter, Cpl. Every, Sgt. Gibbens, Ptes. Naylor, Evans, Lunn, Roberts, Pye, Croft, Wood, and Johnson.

## FLIGHT-SERGEANT SIDNEY GEORGE.

WE have perused an interesting communication received from Sidney George, the well-known Indian rider, and give hereunder a few extracts: "No doubt you would be interested if I gave you a description of the motor cycle repair shop of which I have charge. On October 16th an old warehouse was lent out to me as the motor cycle shop was to run. I can tell you, it did not look very encouraging, but with the aid of carpenters and one or two fatigue parties we worked wonders, and now I have a shop of which I am very proud. I wish I could get some photographs, but, of course, it is not possible at present. The



Flight-Sgt. Sidney George, R.F.C.

warehouse that was is partitioned off into shops, and these consist of the dismantling shop, where all the P. and M.'s are pulled down; the engine shop, to which the engines and gears are sent; the frame shop, where frames and forks are brazed; the wheel-builders' shop, and shops where tanks, chain cases, and mudguards are handled by the tinsmiths, so that each part goes to the men told off to repair it. The largest portion is kept for the erectors, where four men are busy every day. A shop has been built for the fitters, where every part is re-assembled, and two ovens kept going all day long. I have twenty-four men, who are kept up to their work to turn out a complete overhaul a week, and up to date the job number is 230, that is, 200 complete overhauls since October. A record is kept of all machines—what parts are used, who repaired the units, who selected the motor cycle, and how it performed on test—so you see the work is not shirked in any way. At present there are over ninety machines waiting for overhaul. An Austin two-cylinder set supplies the light, and power for the lathe,

drilling machines, emery wheels, etc. I have had the supervision and testing of all the machines overhauled in this shop. And speaking of tyres, I have found the Kempshall a really marvellous tyre for reliability and stability. Despite the terrible roads, they stick it and stand the most severe tests. I have one competition rider in my shop—Neville Hall, of O.K. fame—and wish I had a few more like him. The P. and M. is a very nice machine for the job. But what would I give for a roar on my old 7 h.p. Indian, and what a blessing an Indian spring frame would be on these roads!" Sidney George is now a flight-sergeant in the R.F.C., having been promoted from first air mechanic.

□ □ □

## RACING WITH VICKERS-CLYNOS.

AS a change from the ordinary routine of training, races with Vickers-Clyno outfits were arranged recently at a training centre in the Midlands, and caused a good deal of excitement and



The winning team of Vickers-Clynos in a race which took place recently at one of the large Midland camps.

interest. Sgt. Harlow, of the M.G.C. (motors), in writing about the event, says a distance of 250 yards had to be covered and the guns placed in action on a given target which was mounted ten yards in

front of the cycles. Six teams competed, the race being won by the team shown riding past the huts led by an officer mounted on a Douglas.

□ □ □

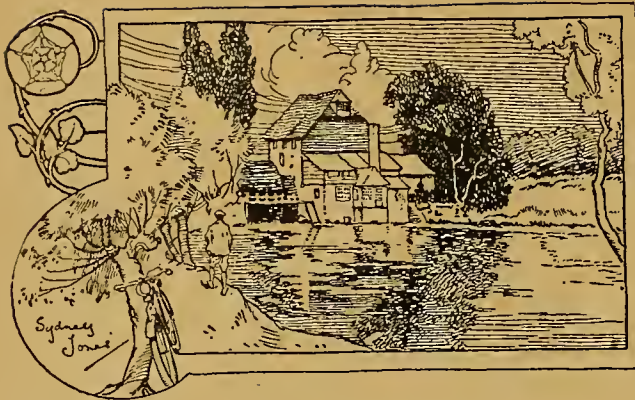
## OVER-AGE MEN FOR HOME DEFENCE.

LORD FRENCH, speaking at Ilford recently, appealed to men physically fit and over the military age to join the "A" section of the Volunteers for home defence. The intention of the Government in re-establishing the Volunteers, he said, and the use to which it was intended to put them, were simply to provide efficient home defence in case of invasion; and, inasmuch as all men of military age were required at the Front, it was expected that this duty of home defence would be undertaken by men who were over that age, but were still sound and fit in body and mind to take their share in this work. They were not asked to go out of the country in any circumstances whatever. They were not even asked to leave their

homes or the districts in which they lived. They were asked only to enrol for this service and, to spare a few of their leisure hours in preparing and fitting themselves as efficiently as possible. The men who could be absolutely counted upon for the defence of this country were these "A" men, and one could make no efficient plan for the defence of this country in case of invasion unless one could count with certainty upon the number available at the moment. He wanted them to do their utmost to make every available

man join the Volunteers, and make that addition of strength really effective. This could be done by inducing all men who were in the "D" class to take service as "A" men.





**D**URING the past few months much has been written on the *pros* and *cons* of the four-cylinder motor cycle, and the purpose of this article is to discuss a few of the leading features in the design of the engine, particularly regarding weight, as there appears to be a prevalent but erroneous idea that the type is excessively heavy. A comparison with aeroplane practice will show that within certain limits a multiplication of cylinders leads to a reduction in weight. Paradoxical though it may seem, the eight-cylinder engine can be made as light as the four-cylinder of an equal capacity, though that question does not enter into the sphere of motor cycling. Trials carried out by the Automobile Club of France and other bodies show that an air-cooled aeroplane motor can be built of a weight under 5 lb. per brake horse-power, a figure which, when compared with motor cycle engines, shows that the question of serious weight reduction has scarcely ever been considered.

#### Piston Pressure and Inertia.

Two fundamental requirements of a smooth and flexible engine are perfect firing and running balance, and both are unobtainable with a single-cylinder, as the power stroke occurs only every other revolution, and it is impossible to balance the reciprocating parts against the revolving portions of the mechanism. With a four-cylinder engine the explosions occur at equal intervals, twice every revolution, and the moving parts are all balanced against each other. A further and important factor arising from dividing up the work among a number of small units is the reduction of stress in the working parts with consequent possibilities in the way of reduction of weight and wear of bearing surfaces. The internal stresses in an engine arise from two things: the explosion pressure and the inertia of the moving parts. The explosion pressures are reduced proportionately to the area of the pistons, which varies as the square of the cylinder diameters. For example, in the case of the four-cylinder F.N. and an 85 mm. x 88 mm. single-cylinder engine, this is 52.5 mm. x 52.5 mm. to 85 mm. x 85 mm. or 1 to 2.6. Taking the explosion pressure to be 300 lb. per square inch, this amounts to 1,010 lb. and 2,640 lb. on the two pistons under consideration.

The inertia pressure may be explained as follows: As the piston comes to the top or bottom of its stroke it slows up, stops instantaneously, and starts moving again in the opposite direction. The resistance of the

## Design of Four-cylinder Motor Cycle Engines.

Points in which the Four-cylinder Engine  
is Superior to Common Practice.

moving parts to this change in velocity and direction of motion is said to be due to their inertia, and results in a pressure which reacts on the bearings and depends on the weight and rate of acceleration and retardation. At high speeds the pressures so caused may even exceed those due to the explosion, and form an important factor in engine design.

#### Weight per Horse-power.

The modern single-cylinder motor cycle engine has the greatest weight per horse-power of any type used for vehicle propulsion, due chiefly to the large and heavy flywheels required. When placed inside the crank case they average about 8½ in. diameter and weigh 25 lb. to 30 lb. per pair, while the miniature four-cylinder of 500 c.c., owing to its perfect balance and even firing, does not require more than 10 lb., and this can include the clutch. This is also the correct location for the latter, as the speed being highest the pressure and surface required is least, so that it can be made smaller and lighter than if placed anywhere else in the transmission system. What would be thought of the car designer who incorporated the clutch in the back axle, as is so often done on a motor cycle?

We will continue the discussion of the weight question by taking comparisons between a well-known and representative 500 c.c. single-cylinder engine and the 5 h.p. F.N., as the latter is the only successful four-cylinder of this size. Regarding the reciprocating parts. The usual 85 mm. piston weighs, complete with rings and gudgeon pin, 1 lb. 6 oz. to 1 lb. 12 oz., and the connecting rod 14 oz. to 1½ lb. This gives an average weight of piston and connecting rod of 2 lb. 10 oz., which, it should be noted, cannot be perfectly balanced. The four 52½ mm. diameter pistons of the F.N. have a total weight of 2 lb. 6 oz., and connecting rods 1 lb. 4 oz., the reciprocating weight per cylinder thus being 15½ oz. These masses are perfectly balanced, and the stresses due to the inertia and explosion are largely reduced.

The limitations of crank case width, etc., reduce the bearing surfaces of the conventional single or twin to absurd proportions, while on a miniature four-cylinder they can be made of the same generous dimensions as on a high-class car. This means lessened pressure per square inch of bearing surface, with better lubrication and longer life. The previously referred to limitations make the usual motor cycle valve gear a difficult matter to design and construct.



**Design of Four-cylinder Motor Cycle Engines.—**

The valves have to be large and the springs strong, while the operating mechanism must be packed into a case an inch or so wide, thus involving narrow gear wheels and tiny bearings, which are difficult to lubricate. On the other hand, the valve gear of a car engine is almost uniformly satisfactory, largely due to its being in the crank case, ensuring a sufficiency of oil, with accommodation for ample bearing surfaces. The same advantages apply to the miniature four-cylinder, while the small valves and light springs reduce the stresses in all parts.

The four cylinders of an F.N. total 12 lb., and an 85 x 88 cylinder averages 8 lb. An important point in connection with air cooling is that the smaller the cylinder the easier it is to keep cool. This is because the surface of a cylinder is proportionate to its diameter, while its volume increases as the square of its diameter, so that the volume increases at a greater rate than the cooling surface. Better cooling permits the use of a higher compression, while a thinner oil can be employed with consequent reduced carbonisation and friction. With inside flywheels there is an appreciable loss arising from the churning up of the oil between the flywheels and the crank case, and it is an open question whether this does not more than counterbalance the loss due to the extra bearing surfaces of an equivalent four-cylinder.

The F.N. crank case in cast iron weighs 17 lb., but if made in aluminium could easily be reduced to about 11 lb., which does not compare unfavourably with the usual type having inside flywheels. The weight of the complete single-cylinder engine with magneto, silencer, and belt pulley is 84 lb., and the four-cylinder engine with cast iron crank case and including the clutch comes out at 72 lb.

Take the case of larger engines up to 1,000 c.c. The ordinary V twin has a lower weight per horsepower than the single, as the flywheel weight is about

the same with the addition of an extra cylinder, piston, and valve gear, but even then a four-cylinder engine offers greater scope for weight cutting.

**Balance and Torque.**

Compared with the flat twin, there is not much to choose on the score of balance, torque, or weight, but with two or three noteworthy exceptions the type does not appear to have become popular, due probably to its length and the difficulty of designing a really suitable frame. Actually, with a ball bearing crankshaft and the magneto placed alongside the engine, a four-cylinder can be built very little longer than the first two types mentioned, and certainly shorter than a flat twin, with the advantage that it lends itself exceedingly well to good frame design. The down tube of the frame can be divided and made double, the engine resting on bearers between the two parallel tubes, giving a very stiff construction, which does not depend on the crank case for obtaining its rigidity, as is usually done, this being another instance of car practice applied to motor cycles.

One essential of success is continuous and automatic lubrication, but in the light of modern knowledge this is not difficult, and could be done on car lines with fixed troughs under the connecting rods, fed by a small gear pump submerged in the oil in the lower half of the crank case. Owing to its being placed longitudinally in the frame and the relatively short stroke, limitations in width and height do not seriously affect the engine, which is as adaptable to scientific design and construction as the best car engines, and with good materials there is no reason why it should not be as reliable.

This article does not do more than touch on the fringe of a very interesting subject, and is only intended to show that the four-cylinder motor cycle engine is not such a difficult problem as it appears at first sight.

E.C.

**MOTOR VOLUNTEERS.**

Motor cyclists are performing useful work in conveying men from the Front from one London station to another at night when ordinary vehicles are unobtainable. The corps shown is attached to No. 1 Squadron, County of Middlesex Volunteer Transport Corps. There are still vacancies for a number of sidecarists, who should apply to Mr. W. E. Boyce, 331, Archway Road, Highgate, N.6.





## SPECIAL FEATURES

MOUNTAINEERING ON A MORGAN.  
DESIGN OF FOUR-CYLINDER ENGINES. MECHANICS FOR THE MOTOR CYCLIST.

## TIME TO LIGHT LAMPS

## SUMMER TIME.

Aug.	9th	...	...	9.4	p.m.
"	11th	...	...	9.0	"
"	13th	...	...	8.57	"
"	15th	...	...	8.52	"

## Our Aim.

Robert Burns was a great poet, and he has made Scotland dearer to the memory of the exiled Scot. In these days when so many are exiled we hope *The Motor Cycle* will bring fragrant whiffs of by-trodden paths. May we be the Bobby Burns of the motor cyclist—such is our aim.

## Devonshire Roads.

Many of the country roads in the tourists' routes of North Devon are distinctly rough and pot-hole, but one is repaid by finding the many beautiful villages free at last from the scourge of the day tripper. There are, of course, no pleasure steamers running this year, and most of the public services are stopped, so that the villages are suffering from a shortage of visitors.

## Conserving Petrol Supplies.

The ways of the Petrol Control Board are weird and strange. When, on July 31st, it became known that there was no object in trying to make a three months' licence spin out over six months, there was a general rush to the garages to obtain July's supply. But, hi-presto! there was no petrol to be bought, and no more to be supplied to the large dealers for a day or two. There are other ways of conserving the petrol supplies beside licences.

## On the Perverseness of Babies.

Two-strokes are kittle cattle. The expert is sometimes puzzled by them, but the majority of riders take them as they go without attempting to analyse the various inequalities of running that frequently manifest themselves. When a machine, which previously ran ninety miles to the gallon of petrol, suddenly drops to sixty over the same course, there is usually a good reason for such behaviour, but it is not easily found, as was the case with a reader's two-stroke recently. It happened that the machine was put in the garage and not touched after its petrol devouring display. A few days later it was taken out again and accomplished the same journey at ninety miles to the gallon and pulling infinitely better. Who can deny the perverseness of the babies when such a thing happens? Would that leaving the machine in the garage for a few days would always work such wonders!

## Overseas Machines.

Norton Motors, Ltd., whose new military model is particularly adapted to Overseas requirements, inform us that these machines are to be known as the Empire model, instead of the Colonial model as hitherto.

## Another American Record.

Clelo F. Bruschi has beaten Lt. E. L. Hoffman's twenty-four-hour sidecar record of 963 miles by covering 1,000 miles in 22h. Bruschi, mounted on a Harley-Davidson outfit, went over practically the same course as Hoffman, and abandoned the run with two hours to go on reaching the 1,000 miles mark.

## Sea Fishing.

Scores of motor cyclists are probably looking forward to spending a few days sea fishing this month, and for the benefit of such we would state that very stringent measures have been taken to limit pleasure boating of any kind. No seaman under 60 years of age is now permitted to undertake pleasure cruises, for which special permits are required.

## Noisy Valves.

The clatter of overhead valves on many highly efficient twin-cylinder engines is really beyond all reason, and a delightful machine may be spoilt by the hideous din it makes. If we are to have overhead valves on solo mounts—and undoubtedly we are—then some attempt must be made towards silencing the mechanism, or many riders will fight shy of this type of engine.

## A Motor Cycle Stolen.

Sgt. Frank Offer, C Company, 3rd Training Battalion, informs us that his 2½ h.p. New Imperial J.A.P. machine has been stolen. The engine number is A2318, the frame number is A5137, and the registration number is LR2362.

## Munition Workers' Motor Cycle Repairs.

At one or two South London motor cycle depots the repair and tuning of motor cycles owned and used daily by munition workers are especially undertaken, few having the necessary time to attend to their own machines. Light weights, and the Douglas in particular appear to be the favourite mounts, and most riders carry their day's meals in a carrier bag. Some of the machines cover twelve to twenty miles a day, and most use substitutes. One Enfield had a substitute carburetter and small petrol tank for starting.

## Old Petrol Permits.

The new restrictions demanding the return of early licences, though, of course, quite just, are apt to hit those who have made real attempts to economise hardest of all. Many riders have avoided buying petrol until they actually required it, with the result that these worthies now find themselves with old licences on their hands, and with precious little chance of obtaining new ones, while others have obtained their petrol as it fell due and stored it. In this world it always pays to keep up-to-date.



Chief-Gnr. Kenneth R. Waite, who was wounded in the Dardanelles, delivering a recruiting speech to employees outside the main entrance of the Harley-Davidson motor cycle factory at Milwaukee. Waite, who is recuperating from his wounds, is using his time to good advantage by placing himself at the disposal of the United States Army and Navy.



**Competition Rider Married.**

Kenneth V. Chidley, who successfully rode a flat twin Brough in competition in 1914, was married on August 4th to Miss Mahel Gibson. The best man was P.O. S. P. Brown, R.N.A.S., who rode a Zenith in the last London-Edinburgh.

**Joy Riding.**

People residing in famous touring districts, such as the Lake District, claim that almost as much pleasure riding is going on as ever before, but they should bear in mind that every holiday motorist on the road makes for such centres. Peace-time Bank Holidays found the Coventry-Kenilworth road alive with pleasure vehicles, but during the busiest hour of Bank Holiday this week we met but one motor cycle and one car while travelling between the two towns named, though the road was crowded with pedestrians and pedal cycles.

**Cancellation of Petrol Licences.**

In connection with the Order issued by the Petrol Control Committee cancelling petrol licences issued prior to April and May last, we append a letter sent by Major Stenson Cooke, Secretary of the Automobile Association and Motor Union, to the Secretary of the Board of Trade, under date July 31st:

**"Re PETROL LICENCES.**

"Sir,—With reference to the notice issued by the Petrol Controller whereby full duty petrol licences for private motor cars and motor cycles issued prior to April and May last are cancelled, I am directed to submit a strong protest on behalf of many thousands of members of the Automobile Association and Motor Union.

"Motorists holding such licences have always been given to understand that they were under no compulsion to draw their monthly allowances as they fell due. Moreover, this Association has been informed by the Petrol Control Committee that by refraining from exercising their licences, motorists would always reserve the right to obtain such allowances at a later date.

"I would add that many motorists, relying upon the assurance of the Petrol Control Committee that they were entitled to do so, have saved their small allowances for consumption during their annual vacations. . . . They have been encouraged to do so by the following answer given in the House of Commons on July 16th last by Mr. G. Roberts to Mr. Cathcart Wason:

"It is probable that there is still a certain amount of motoring for pleasure carried on by owners of cars who are using up stocks of petrol, in respect of which licences have been issued in the past. There is no penalty for such motoring, but licences for petrol are now issued only to persons who use their cars for public or business purposes.

"It is submitted that sudden cancellation of unexhausted petrol licences inflicts unmerited hardship upon those who have conscientiously supported the Government by economising in petrol, while others have regularly drawn their allowances for business or pleasure purposes.

"I am, sir, yours faithfully,

"STENSON COOKE, Major."

**Motor Cycles for American Army.**

Contracts for \$988,000 worth of motor cycles were awarded on July 19th by the War Department of the United States on bids submitted recently at the Quartermaster's Depot. The largest portion of the order went to the Hendee Manufacturing Co., which has accepted the contract to supply the Government with 2,500 twin Indian motor cycles. The remainder of the order went to the Harley-Davidson Motor Co., which is to supply the United States Army with 1,500 Harley-Davidsons. The motor cycles are to be bought at a uniform outside price of \$247 apiece, and the manufacturers have undertaken to make several more or less radical changes in the design to bring the machines more nearly into conformity with standard specifications threshed out at Washington on June 28th by members of the motor cycle trade and Army officials. The order also calls for a cancelling of private order work now going through the two factories until the Government's first really big order has been consummated.

**A Series of Harley-Davidson Triumphs.**

Before a crowd of fully 7,500 spectators, mostly enthusiastic motor cyclists, Otto Walker, on a Harley-Davidson, carried off a great victory in the 100 mile event for professionals on the Sheephead Bay Speedway on July 12th. Walker made fifty laps on the two-mile board track in 1h. 17m. 0<sup>3</sup>/<sub>4</sub>s., having led thirty competitors throughout the greater part of the race. Harry Smith, another Harley-Davidson rider, piloted a second machine of that make into second place. Mike Costello, yet another Harley-Davidson rider, together with Leslie Parkhurst, on the same make of machine, took third and fourth places. The fifth place was secured by George Hamilton, riding an Indian. Average speed, 77.9 m.p.h.

There were so many entries for the six-mile sidecar event that it had to be run off in heats. Thomas Monte won the first heat by a narrow margin from August Landan (both of whom were riding Harley-Davidsons), the time occupied by the winner being 6m. 19<sup>1</sup>/<sub>2</sub>s. The second heat was won by Jacob Henkel (Harley-Davidson) in 6m. 41<sup>3</sup>/<sub>4</sub>s., while another Harley-Davidson was second in the same heat. In the final, Henkel just succeeded in beating Landan on the line, the time taken being 6m. 12<sup>3</sup>/<sub>4</sub>s. As both Landan and the third man were riding Harley-Davidsons, all three places went to this well-known make. Average speed, 58 m.p.h.

Harley-Davidsons again proved victorious in a four-mile amateur race, coming in first, second, and third. The time taken was 3m. 13<sup>3</sup>/<sub>4</sub>s. Average speed, 74.4 m.p.h.

The twenty-mile amateur race for stock machines was won by Joseph Farrell on an Indian; time, 15m. 37<sup>1</sup>/<sub>2</sub>s. In this race Harley-Davidsons took both second and third places. Average speed 76.9 m.p.h.

A feature of the meeting was an exhibition ride, on an eight-valve Indian, by Arthur Chapple, in full uniform. He covered a distance of two miles in 1m. 25<sup>1</sup>/<sub>2</sub>s., and received a great ovation from the crowd of spectators. Average speed 84.5 m.p.h.

**Critical Petrol Position.**

Middlesbrough tradesmen have pointed out that more horses could be released and an economy in cereals effected if more petrol were distributed for business purposes. The Town Clerk has received a reply from the Petrol Control Department, stating that the petrol position is extremely critical, and that unless there is some material improvement in the situation Sir Evan Jones is not prepared to release any further supplies for civil and industrial needs.

**AVERAGE PRICES.**

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average. The word "combination" indicates a sidecar outfit as supplied by the makers, while "sidecar" implies that the fitting has been carried out by the owner.

Make.	Year.	H.P.	Average last week.	Previous weekly average
A.B.C. ....	1914	3 <sup>1</sup> / <sub>2</sub> -speed .....	—	£40
Abingdon ..	1914	5-6 3-sp. sidecar ..	—	£54
A.J.S. ....	1916	6 combination ..	—	£92
" .....	1914	6 combination ..	£60	£60
" .....	1916	4 combination ..	—	£78
Allon .....	1916	2 <sup>1</sup> / <sub>2</sub> -speed .....	£28	£34
" .....	1914	2 <sup>1</sup> / <sub>2</sub> -speed .....	—	£27
Ariel .....	1915	3 <sup>1</sup> / <sub>2</sub> -speed .....	—	£43
" .....	1914	5-6 combination ..	—	£51
Bat .....	1914	6 3-speed .....	£45	£48
Bradbury ..	1914	4 2-sp. sidecar ..	—	£41
Brough .....	1916	3 <sup>1</sup> / <sub>2</sub> -speed .....	—	£55
B.S.A. ....	1916	4 <sup>1</sup> / <sub>2</sub> sidecar .....	£61	£65
" .....	1915	4 <sup>1</sup> / <sub>2</sub> sidecar .....	—	£55
Calthorpe ..	1916	2 <sup>1</sup> / <sub>2</sub> -speed .....	£28	£30
" .....	1915	2 <sup>1</sup> / <sub>2</sub> -speed .....	£27	£25
" .....	1916	2 <sup>1</sup> / <sub>2</sub> -stroke .....	£28	£30
Clyno .....	1915	2 <sup>1</sup> / <sub>2</sub> -stroke .....	£25	£26
" .....	1914	6 combination ..	£58	£68
Connaught ..	1915	2 <sup>1</sup> / <sub>2</sub> -stroke .....	—	£24
Douglas .....	1916	2 <sup>1</sup> / <sub>2</sub> -speed .....	£40	£46
" .....	1915	2 <sup>1</sup> / <sub>2</sub> -speed .....	£42	£43
" .....	1914	2 <sup>1</sup> / <sub>2</sub> -speed .....	£36	£35
Enfield .....	1916	6 combination ..	£80	£82
" .....	1915	6 combination ..	—	£70
" .....	1916	3 2-speed .....	£44	£45
H.-Davidson ..	1916	7 combination ..	£87	£84
" .....	1915	7 combination ..	£66	£67
Henderson ..	1916	7 combination ..	—	£100
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	5 combination ..	£70	£70
" .....	1916	7-9 combination ..	—	£81
" .....	1915	7-9 combination ..	£59	£71
James .....	1916	4 <sup>1</sup> / <sub>2</sub> combination ..	£70	£70
" .....	1916	2-sp. 2-stroke ..	—	£31
Lea-Francis ..	1916	3 <sup>1</sup> / <sub>2</sub> -sp. sidecar ..	£55	£67
" .....	1915	3 <sup>1</sup> / <sub>2</sub> -speed .....	—	£55
Levis .....	1916	2 <sup>1</sup> / <sub>2</sub> Popular .....	£27	£26
" .....	1915	2 <sup>1</sup> / <sub>2</sub> Popular .....	£20	£20
Matchless ..	1915	7 combination ..	—	£82
New Hudson ..	1916	2-sp. 2-stroke ..	—	£28
" .....	1916	4 combination ..	—	£60
New Imperial ..	1916	2 <sup>1</sup> / <sub>2</sub> -speed .....	£32	£35
" .....	1915	2 <sup>1</sup> / <sub>2</sub> -speed .....	£26	£27
Norton .....	1916	3 <sup>1</sup> / <sub>2</sub> -speed .....	—	£52
" .....	1915	3 <sup>1</sup> / <sub>2</sub> T.T. ....	—	£43
P. & M. ....	1915	3 <sup>1</sup> / <sub>2</sub> combination ..	—	£65
" .....	1914	3 <sup>1</sup> / <sub>2</sub> 2-speed .....	—	£50
Premier .....	1915	2 <sup>1</sup> / <sub>2</sub> 3-speed .....	—	£28
" .....	1914	3 <sup>1</sup> / <sub>2</sub> 3-speed .....	—	£47
Rover .....	1916	3 <sup>1</sup> / <sub>2</sub> 3-speed .....	—	£52
Rudge .....	1916	3 <sup>1</sup> / <sub>2</sub> Multi .....	£45	£46
" .....	1915	3 <sup>1</sup> / <sub>2</sub> Multi .....	—	£38
Scott .....	1916	3 <sup>1</sup> / <sub>2</sub> combination ..	—	£50
Sunbeam .....	1916	8 combination ..	—	£100
" .....	1916	3 <sup>1</sup> / <sub>2</sub> solo .....	£76	£76
" .....	1915	3 <sup>1</sup> / <sub>2</sub> combination ..	£80	£72
Triumph .....	1916	2-sp. 2-stroke ..	£34	£38
" .....	1915	4 countershaft ..	—	£55
" .....	1915	2 <sup>1</sup> / <sub>2</sub> 2-sp. 2-stroke ..	—	£25
" .....	1914	3 <sup>1</sup> / <sub>2</sub> 2-sp. 2-stroke ..	£42	£40
Velocette .....	1915	2-sp. 2-stroke ..	£33	—
Zenith .....	1915	8 Gradua .....	—	£61





## Second Instalment: FORCE.

The first instalment appeared on July 19th, 1917.

It is hardly necessary to point out to thinking motor cyclists the great desirability of a little mathematical knowledge—so many questions may crop up, as, for instance, the horse power required to mount a certain hill, the tension of a belt or chain when driving a heavy machine, or the calculation of a gear, that the man who is entirely ignorant of these matters must often be at a loss. In this and the following articles (of which there will be several) the author proposes to discuss some of the simpler problems dealing with speed, acceleration, force, inertia, centrifugal force, etc., and their practical application to everyday questions in a popular manner without unnecessary technicalities. No motor cyclist, therefore, need pass by these articles under the impression that they are beyond his understanding, for everything is explained in simple language.

**M**OTOR cyclists as a class have exceptional opportunities of verifying the definition that "Force is that which causes motion." At any rate, they are well aware that motion cannot be produced without the application of force, though they have doubtless learned by bitter experience that there are occasions when a prodigious expenditure of force causes no motion whatever. To meet such cases as the latter, the definition must be expanded into the following form: "Force is that which changes or tends to change a body's state of rest or of uniform motion in a straight line." The emphasis in this statement should be laid on the word "changes."

The mere fact that an object is in motion gives no indication as to what (if any) forces are acting on it; if the motion is uniform, the explanation may be either that no force is being applied or that a number of forces are in operation whose effects neutralise each other. For instance, a motor cycle romps up a stiff gradient at a steady 30 m.p.h. not because no forces act on it, but because the propulsive force exerted by the engine exactly balances the effects of gravity, of wind resistance, and of road friction. Similarly, absence of motion by no means necessarily implies absence of force—a ship may remain motionless on the water either for the reason that no (horizontal) forces are in operation, or because the considerable forces exerted by wind and tide are balanced by the pull of the anchor chain. But if the body *changes* its speed—if it undergoes acceleration or retardation—then it can be said with absolute certainty that one or more forces must be at work on it.

### The Cause of Engine Vibration.

The connection between the force acting on a body, the weight of the body, and the acceleration produced,

is one of the most important in the whole of mechanics. It is, however, extremely simple:

Force (lb.)

$$= \frac{\text{Weight (lb.)} \times \text{Acceleration (feet per sec. per sec.)}}{32}$$

The application of this law to some of the motions of a motor cycle engine yields rather interesting results. Taking as an example the motion of the piston, this component and its attachments are subjected to rapid and violent accelerations, for during the first half of each stroke the piston rapidly increases its velocity from zero to quite a high figure, while during the latter

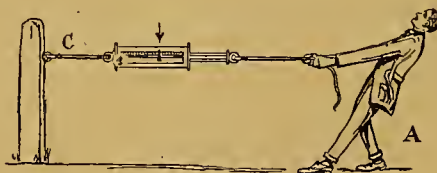
part of the stroke a correspondingly rapid retardation must occur. In a  $3\frac{1}{2}$  h.p. engine turning at 2,000 r.p.m., the maximum value of the acceleration will probably be of the order of 7,000ft. per sec. per sec. If the weight of the piston is, say, half a pound, we find that the force required to accelerate it will be  $\frac{1}{2} \times 7,000$  lb., which is

$\frac{32}{2} \times 7,000$  roughly 110 lb. It is this force that is responsible for the more or less objectionable engine vibration with which all riders are familiar.

It may also be profitable to examine the motion of the valves, which are evidently subjected to very considerable variations of velocity. With a valve lift of 0.4in., and engine speed of 2,000 r.p.m., the acceleration of the valves, tappets, etc., will attain a value, in round numbers, of 2,000ft. per sec. per sec. Taking the weight of one valve together with all the parts that move with it at 0.2 lb., the force necessary to produce the requisite rapidity of opening and closing is

$$\frac{0.2 \times 2,000}{32} = 12.5 \text{ lb.}$$

This figure at once explains the necessity of the powerful springs that are called for in controlling the valves of high speed engines.



Action and reaction are equal and opposite. Notice that the tension of the spring is the same, whether the spring be fixed to a post or held by a second man pulling in the opposite direction.





**Mechanics for the Motor Cyclist.—**

There is one fundamental law of mechanics that many people find great difficulty in understanding—"action and reaction are equal and opposite." Translated into everyday language, this statement means that if you push a wall with a force of 20 lb., the wall will push back at you with a force also of 20 lb. The force exerted by you is the "action"; the equal and opposite force with which the wall retaliates is the "reaction." The doubtful point is, *does* the wall put forward this alleged reaction? How can a rigid, inanimate body exert a force? The accompanying sketches may be helpful in settling this question. *A* in the first diagram is represented in the act of trying his strength by means of a rope attached to a post, a spring balance indicating what pull he exerts. Suppose the force registered on the balance is 150 lb. If we now substitute for the post another human being *B*, we know perfectly well that *A* can only maintain his pull of 150 lb. as long as *B* also pulls in the opposite direction with a force of 150 lb.; that is, *A* is prevented from toppling backwards only by the effort that *B* exerts. But since, when pulling against the post, *A* felt in no danger of being let down,

clearly *something* must have been holding him up with a force of 150 lb. The only agency that can exert this force is the post; in other words, the post is pulling against *A* just as definitely as *B* is. If *A* is impervious even to this reasoning, let us try a more drastic proof. Let us impress upon him that while moderate strength rings the bell, great strength returns the penny, and then we will surreptitiously cut the rope at *c*. If the ensuing shock does not carry conviction to his mind, nothing will!

**Action and Reaction propels the Motor Cycle.**

The reason why I have to some extent laboured this question of action and reaction is simply this, that if action and reaction were not equal and opposite, I should not be writing these articles at all, for there would be no motor cyclists to read them. For what is it ultimately that propels a motor cycle along the road? Nothing more than the reaction of the road surface on the back tyre. The engine causes the tyre to exert a *backward* force on the road surface; the road exerts an equal and opposite reaction on the tyre, and this it is that pushes the machine forward.

MOHANDIS.

*(To be continued.)*

## That Hot Spot.

RECENT comments on the subject of a hot spot in the piston call to the writer's mind his experience with a machine he possessed in pre-war days. The machine was a P. and M. of unusual kick and vitality—a picked machine.

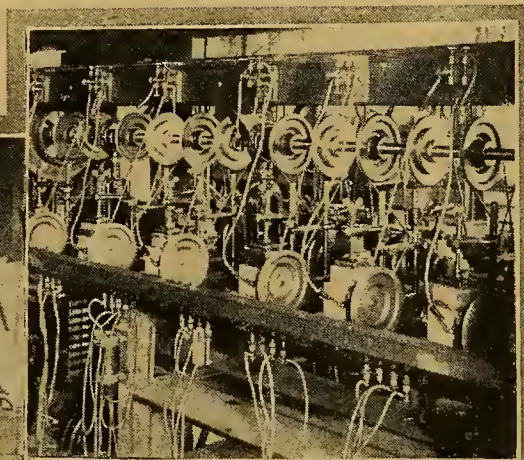
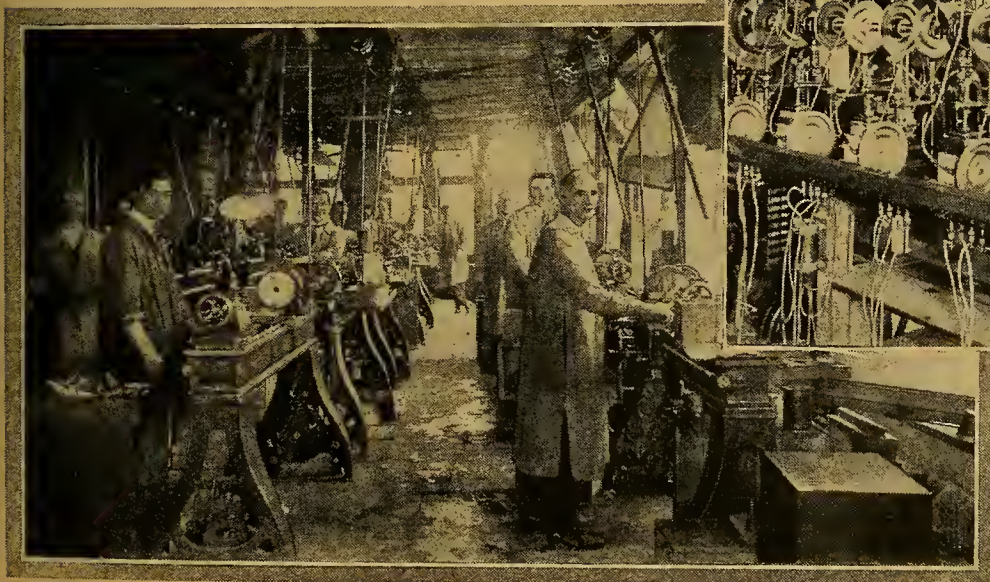
The mount possessed one unaccountable peculiarity, in that the crank case always became so hot that one could hardly bear to touch it. It was a marvellous machine, wonderfully efficient in every way; the cylinder and piston were a dead true fit, rings beautifully faced all the way round, and so on, and that the heat of the crank case was not due to conductivity I proved to my own satisfaction by

placing a fairly thick asbestos washer between the cylinder and crank case. The only trouble the heating caused was that the inside of the piston made up with carbon in a surprisingly short space of time. Why? The compression was varied to suit the various conditions of riding, but the mystery was never solved. Can any reader explain?

Possibly the piston warped slightly when heated up, but it is rather strange that the engine ran very much better when thoroughly hot.

CHINOOK.

WHERE THE B.L.I.C. MAGNETO IS MADE.



The light turning section, where armature spindle, contact breaker parts and other small parts are turned. (Inset) One of the benches where the magnetos are tested by prolonged running.



# THE Critic

Fireside Chats on  
Motor Cycle Problems

## CHAIN OR BELT DRIVE?

"I WAS testing a topping little machine to-day," announced the Journalist. "A T.T. flat twin, which very nearly flew. But the day being wet, I was let down horribly by the belt drive." "What do you mean by that?" snorted the Manufacturer, who rather favoured belt drives.

"Just this. The day being wet and the roads being wet, the belt gave trouble, as belts invariably do under such conditions. The man with me was riding an all-chain Norton. On the outward journey I could leave him standing, except on the hills, but after thirty miles of it the fun began. On the return journey he beat me every way—simply because I could not accelerate without belt slip. I felt like a winged duck with a spaniel after it, and at the end of the run he had beaten me hollow on petrol and oil consumption—simply on account of my beastly belt drive."

"I have had the same experience," announced the D.R. "In my opinion, the modern chain-cum-belt drive is no better as regards the nuisance of slip than was the direct belt drive of yesterday. In the latter you lost on the small pulley, but you gained on the length of drive—to-day you gain on the large pulley but you lose on the absurd shortness of the drive. Probably, therefore, the chief reason why the chain-cum-belt drive of to-day is considered superior to the direct drive is because we have better engines and good clutches, together with gear boxes, which combination enables one to maintain a more or less even torque on the belt. It goes without saying that belts, too, are infinitely superior to what they were."

### The Advantages of Both Systems.

"Look here, you chaps," broke in the Journalist, "I didn't mean to start a dispute. This matter has already been pretty well threshed out in *The Motor Cycle*. 'Ixion' has put the case clearly and with his usual remarkable conciseness. A fortnight later 'Chinook,' inferring that he disagreed with 'Ixion,' said practically what 'Ixion' said, only in a different way. Let's drop it."

"No fear," returned the D.R. "The object of recording these disputes is, I presume, to present every side of the question from the points of view of different riders—to throw the subject on the threshing floor, as it were, and let everyone have a bat of it. To debar a subject just because a few old hacks have earned their weekly salaries out of it is not fair. Go ahead, Novice. Let us hear what you have to say."

So the Novice, who had been restive for some moments, spouted out that he couldn't understand why so many had their knives into the belt drive. "If a man is addicted to riding an all-chain machine, he curses the belt drive black and blue, and *vice versa*. I think motor cyclists are the most narrow lot of blighters I have ever run up against. The fact is that what you lose on the swings you gain on the roundabouts. Each system has its recommending features—each its defects. I have owned both, so I know."

### Belts Save Tyres.

"Quite right," agreed the D.R., "only you are wrong in one respect. It is not the man who owns a chain drive that curses the belt. It is the man who owns the belt drive that curses it. Go ahead."

"Well, then, take my own experience. My last sidecar twin—6 h.p.—was fitted with belt drive; and though in wet weather I sometimes cursed the belt, it saved me pounds during the three years I had the machine. Do you know that my rear tyres lasted 6,000 miles?—whereas 3,000 is jolly good for a chain-driven twin. The petrol consumption of that machine was marvellous—in fact, it was cheaper to run than the 2½ h.p. two-stroke solo that I owned at the same time."

The Journalist grunted, the D.R. snorted disdainfully. "You are going back to a bygone era in advocating the belt drive for sidecar twins," said the D.R. "It is an admitted fact that the belt drive in any shape or form is off the map for anything but solo mounts. The only point to be argued is as to whether it is suitable for the solo mount."

"I agree," said the Novice, who was quite a sport. "I have merely held up my experience to prove that the belt drive is infinitely cheaper."

"It amounts to this," said the Journalist—"the belt drive is superior to the chain drive simply in the respect that it is, in itself, a shock absorber. A shock absorber arranged as part of the transmission system cannot be made to function to the best effect under all conditions. It must be hand-controlled. In a belt drive we have elasticity as well as slip, but if the average rider could be depended upon to use his clutch as a shock absorber as well as a clutch, there is no reason why he should not obtain results from his back tyre as good as with a belt. With a chain drive at low speeds one must finger one's throttle lever and one's clutch *not* individually, but together; therefore the chain drive demands better driving."

"The Americans realise this," stated the D.R., "and therefore they give you a clutch arranged to act as a shock absorber. The only reason why British riders obtain such poor results from their back tyres with all-chain drive is because they are afraid of using their clutches. A clutch is there to be used; insets wear indefinitely, and even when worn out they are cheaper to renew than tyres and engine bearings."

### The Keynote is Simplicity.

Here the Manufacturer, who had for the most part maintained silence hitherto, had something to say. He said that absolute simplicity was surely what we are aiming at. "Well, look here," said he. "Just think what complications you introduce with the all-chain drive. You admit that you must have an efficient clutch and an efficient shock absorber. The latter is the most awful compromise that modern engineering ever ran foul of. No two engineers can agree where it should be placed, or what form it should take. You yourselves admit that unless it be supplemented by judicious fingering of the clutch it is practically useless. Then take chain cases. These are beastly things to handle; the chains themselves are unclean, while the cases are costly to make, difficult for the amateur to handle, and, moreover, they add a dozen difficulties as regards accessibility. The belt-driven machine is the simpler, the cheaper, and the more efficient. Why, then, do you condemn the belt drive? Simply because it is susceptible to the weather. So is the chain drive, though it does not let you down. I tell you this, that the weaknesses of the belt drive lie not in the system itself, but in its application."

"Then why the deuce don't you manufacturers buck up and give us a belt drive which is applied in the right way?" queried the D.R. "You admit that you like it, and that its weaknesses are at your own doorstep."

The Manufacturer admitted that the design of many belt drives was appalling. "Sometimes the mudguards appear to be arranged purposely to direct water on to the belt, while no provision whatever is made for sheltering the drive from water and oil. I consider," he said, "that the chain-cum-belt drive is ideal for a solo mount, and it is quite possible to eliminate most of its present defects. Unless some effort is made in this direction it will most assuredly be superseded, so makers who favour the belt drive had better get to work on revising their mudguarding, etc."



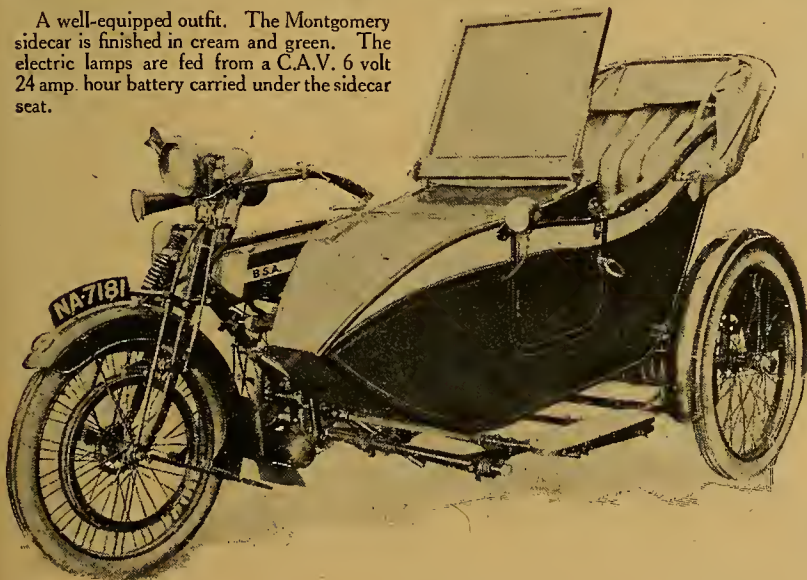
## A 4 $\frac{1}{4}$ h.p. B.S.A. ON THE ROAD.

### A SUCCESSFUL 1,000 MILES WITH A 1917 SIDECAR.

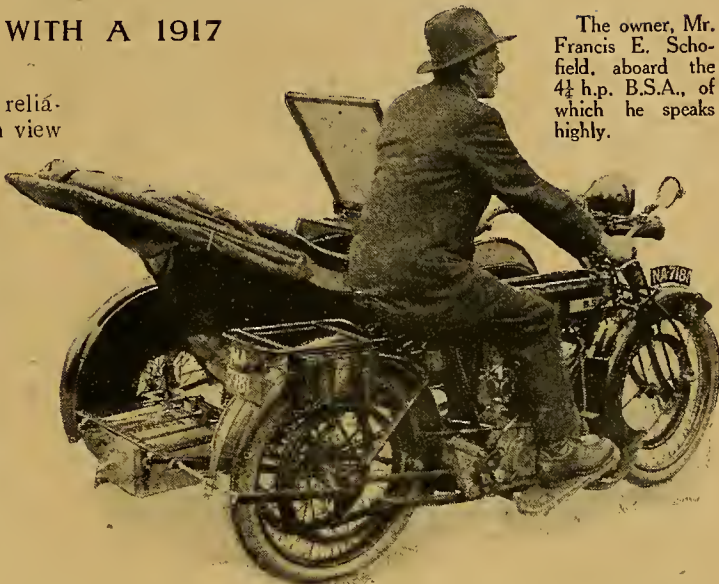
**T**HE B.S.A. motor cycle has a name for reliability—a matter of primary importance in view of the restriction on repair work—and my experience has fully maintained this reputation.

My mount is a 1917 Model K, chain-cum-belt drive, with semi-T.T. bars, and is coupled to a fully-equipped Montgomery sidecar, finished in cream and green to match the B.S.A. tank. The tyres are 2 $\frac{1}{2}$  in. Palmer Cord on all three wheels, to allow for interchangeability, which ensures equal wear and eliminates a lot of anxiety on long journeys. A machine possessing wheels which can be easily removed without disturbing brakes, and interchangeable tyres, constitutes the next best thing to interchangeable wheels, at a fraction of the cost. The magneto is a C.A.V. which deserves to be more universally adopted. It is absolutely reliable, and possesses a number of good points which are a distinct change from the stereotyped Bosch design. The other fittings include a Stewart speedometer mounted on a home-made bracket carried by the mudguard stay fixing screw to allow of the front wheel being removed without disturbing the drive, and a complete set of electric lamps. These are fed from a C.A.V. 6 volt 24 amp.-hour battery, carried under the sidecar seat and controlled by an ordinary trembler switch near the passenger's right hand. The wiring is carried out with brass-armoured twin cable, as used on cars, and detachable plugs are fitted at all the lamps and at the point where the cable enters the sidecar to permit of the removal of any lamp or the complete sidecar without upsetting the permanency of the installation. The set has proved perfectly reliable, and is quite immune to weather conditions.

A well-equipped outfit. The Montgomery sidecar is finished in cream and green. The electric lamps are fed from a C.A.V. 6 volt 24 amp. hour battery carried under the sidecar seat.



The owner, Mr. Francis E. Schofield, aboard the 4 $\frac{1}{4}$  h.p. B.S.A., of which he speaks highly.



Since January the outfit has seen some hard service on our lorry-wracked roads, and in spite of infrequent attention has never once let me down. In the 1,000 miles covered the only breakage has been a top recoil spring on the front fork, which the B.S.A. people kindly replaced. The spring fractured through meeting unexpectedly a succession of pot-holes on the Birkenhead-Chester road, when travelling at close on 30 m.p.h.—an experience which would have spelt disaster to a less sturdy machine. By reducing the speed below 20 m.p.h. I was able to reel off a further forty-five miles the same day before removing the broken spring.

#### Tyres and Transmission.

My luck has been "in" with regard to tyres; none of the three has punctured, and only the back cover shows signs of wear. The parallel ribs on the tread are not more than half worn down, which indicates that the tyre is good for at least another 1,500 miles, with a probable extension by transferring to another wheel. The belt, a 1 in. Dunlop, is in perfect condition, thanks to the sensible size of the countershaft pulley, and has never been touched. On two occasions the eccentric back wheel spindle was revolved slightly to take up the stretch, and this represents the sum total of the attention devoted to the transmission. The front chain has given no trouble, and would still be awaiting its first inspection but for the fact that a reduction in gear ratio necessitated opening up the chain case to remove the existing engine sprocket.

For the engine I have nothing but praise. It will pull for miles on end with an entire absence of effort, and has improved considerably in tune



**A 4½ h.p. B.S.A. on the Road.—**

after a carefully nursed running-in period of about 150 miles.

**Carburettor Adjustment.**

The B.S.A. carburettor is an ideal device for the experimentalist, and allows of an infinite variety of jet openings by turning the milled screw. By careful investigation I arrived at the most economical jet opening, which corresponds to a one-half turn of the screw from closed, and I provided a hot air extension pipe from the air intake to the engine cylinder ribs to ensure that perfect vaporisation took place. As a result the running is almost noiseless on the flat at 15-18 m.p.h., and ample acceleration is obtained, in spite of the fact that my total average consumption is almost 72 m.p.g., and has reached 76 m.p.g. on individual journeys. Incidentally, I might mention a considerable reduction in valve clatter can be made by reducing the tappet clearance to paper thickness only.

Traffic driving was materially simplified by adjusting the throttle and air barrels to allow the engine just to tick over in free with the levers shut off. It is delightfully convenient placidly to take one's place in a string of waiting vehicles, ready for the first sign of motion ahead, with the engine revolving almost inaudibly beneath, without having recourse to frantic grabs at the exhaust lever to restrain the youthful exuberance of a well-tuned big single.

For lubricating the engine I use B.S.A. cylinder oil impregnated with Oildag, and can vouch for the satisfactory nature of the latter product.

**Speed and Power.**

With regard to the machine's capabilities, I have found the engine, in conjunction with the three-speed gear box, quite equal to tackling all ordinary main road hills even with a fully-loaded sidecar and week-end luggage. I should have no fear of undertaking an extended tour, if circumstances only permitted, confident of climbing everything encountered.

As regards speed, I seldom attempt anything spectacular, preferring the humble 20 m.p.h. average and ability to climb main road hills, as mentioned, as sufficient for my personal requirements, but a few days' vacation in N. Wales suggested experiences of a sporting nature, and, time being of no account, a few attempts were made on some local "pimples." These chiefly consisted of disused cart tracks, which lent little opportunity for speed, but provided good fun at impromptu hill-climbing, with the exception of a fairly level stretch of about one mile in moderately good condition. With a male occupant of the sidecar weighing 11 stone, the speedometer needle rapidly rose to 46 m.p.h. on this level stretch, and this speed was maintained for the full distance. A second attempt the following day under more favourable conditions with a slight following breeze, but carrying an extra male passenger on the carrier, yielded even better results. With a total load of 32 stone, the engine accelerated until the needle reached the 45 mark, and maintained the speedometer reading dead steady to the end.

**Summary.**

Summarised, my results are as follow:

Total miles covered, 1,000.

Total petrol consumed, 14 gallons.

Cost of petrol at 2s. 8d., £1 17s. 4d.

Average miles per gallon, 71.4.

Cost per mile for petrol (average), 0.448d.

Total oil consumption, ¾ gallon.

Miles per gallon (oil), 1,330.

Maximum speed on top gear with passenger, 46 m.p.h.

Minimum speed on top gear with passenger, 10 m.p.h.

Minimum speed on bottom gear with passenger, 3 m.p.h.

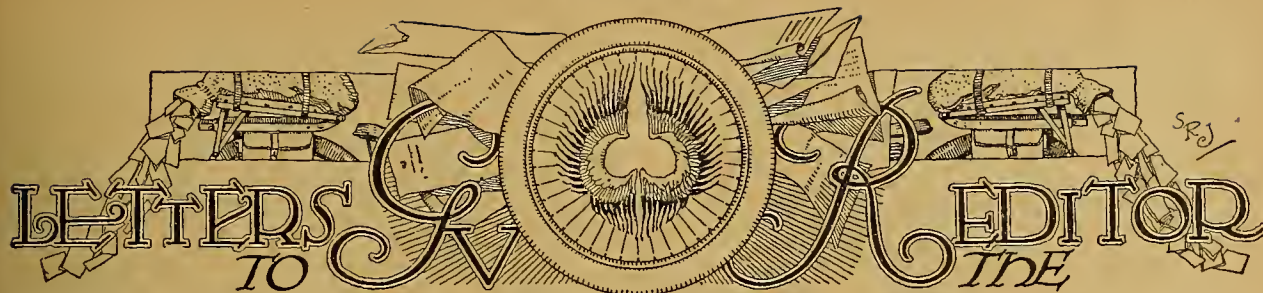
The total cost per mile cannot be given, of course, owing to the impossibility of bringing depreciation into the reckoning.

FRANCIS E. SCHOFIELD.

**BREAKING THE TEDIUM OF CONVALESCENCE.**

The blue cover of *The Motor Cycle* is familiar in most of the hospitals for wounded soldiers, the convalescent in the foreground evidently preferring it to cards. The hospital is at Abbots Ripton, near Huntingdon, the home of Lady Guernsey, who is seen in the background.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### SOME FUEL.

Sir,—While waiting at a garage a curious incident happened. A man on a machine, which looked like a Zenith, rushed into the garage for petrol. The garage man told him he could not have it, so he demanded water, and shouted to the stupefied mechanic to hurry. When the water came, he seized the can and quickly poured its contents into the tank, which soon overflowed. Then he rushed away up a long hill, leaving all present in a state of great amazement.

Did he stop the other side of the hill? Can any reader of *The Motor Cycle* explain this?

R.E.C.

Camberley.

#### A LUDICROUS DERANGEMENT.

Sir,—Referring to a paragraph in your issue of April 19th, commenting on a complaint made by a B.S.A. rider that his machine went better uphill than on the level, it might interest you to hear that I had a similar experience with my B.S.A. (all-chain drive) a few months ago.

I attribute the derangement to weak valve springs. I only experienced the trouble while I was using a pair of springs purchased locally, and obviously weaker than those provided with the machine. These very soon broke, and were replaced by stronger springs. The trouble at once vanished, and has not reappeared.

H.R.J.

Kuala Lumpur, F.M.S.

#### PETROL FILTERS AND DIVIDED TANKS.

Sir,—Your correspondent B. C. Woodward, who wrote with reference to petrol filters and divided tanks, is apparently unaware of the fact that the majority of active service aeroplanes are fitted up with pressure-fed petrol systems, so that partitions, as he suggests, would be useless, unless each were fitted up with a separate pressure system, which would entail considerable complication for a tank of several compartments.

All tanks in use, however, with few exceptions, have several internal partitions, but these are for strengthening purposes solely.

Moreover, I doubt if there is a single machine in use on active service without a filter somewhere in the petrol system.

C. K. SHEPHERD (Lt. R.F.C.).

#### POLICE INTERFERENCE.

Sir,—Being a regular reader of *The Motor Cycle*, and having read of the stopping of motor cyclists, I herewith append questions asked of myself and friend on a recent Sunday in a St. Helens main thoroughfare by the police.

Name and address, age, where employed, occupation; whether riding on business or pleasure; if using petrol (show petrol licence), particulars of where petrol was procured; where had we come from, where going, and how long had we been away; if owner of machine (produce driving licence).

I was driving a combination with my wife and child and father-in-law, and when I told the police I was out for the benefit of the health of the last-named, who had had to give up work on account of illness, his name and address were asked, how long he was staying, when he came, and when he would return.

After all this I was told I should be reported for joy riding, it being illegal. By this time there was a great crowd gathered, which we sorely resented.

The above occurred between 6.30 and 7.0 p.m.

H. ALDRED.

#### ALUMINIUM COOLING.

Sir,—In *The Motor Cycle* of July 5th and 12th reference is made to the use of heat ribs on cylinder walls in order to accelerate heat transmission, and a sketch is shown on page 12 of a cylinder provided with an outside jacket having ribs.

To my mind the arrangement would not produce much of the desired effect, owing to the want of molecular continuity of the barrel and the jacket. This could easily be proved by actual test made with water, as I did many years ago. Anyone interested in the application of heat ribs to cylinders for increasing the rate of transmission may care to look up one of my earlier patents of about forty years ago. Others may have done this before me.

D. H. HALPIN.

#### MOTOR CYCLISTS IN THE ARMY.

Sir,—In the "Blue 'Un" of July 12th I notice that your attention is called to the matter of D.R.'s receiving a reduced salary.

In this paragraph you make use of the following words: "This is almost as bad as the comparatively safe job of driving a car in the Transport Section."

Well, Mr. Editor, do you know what you really imply by the word "safe"? Would you care to come with us some night to the music of Fritz's shrapnel overhead?

I do wish people would really think about what they say before they put it in black and white; in other words, look at the M.T.'s casualty list, and oblige.

Fritz does not care about D.R.'s, it is we chaps he is after.

FRANK TURNER DENTON.

[Our correspondent has quoted us incorrectly. Driving a car in the Transport Section was referred to as comparatively safe, not with reference to D.R.'s, but compared with service in the trenches. Surely no one can deny this! We have certainly no wish to belittle the excellent work done by the A.S.C.—Ed.]

#### PILLION RIDING.

Sir,—With reference to your recent paragraph concerning that most enjoyable and economical form of motoring, pillion riding, perhaps you will allow me to offer a few useful hints conducive to safety. Some years' experience of passenger carrying pillionwise have convinced me that the best kind of mount for this purpose should be fairly heavy with a very strong frame, low built, equipped with multi-cylinder engine, handle-bar clutch control, all-enclosed chain drive, strong wheels with 3in. tyres, and security bolts. The pillion seat should be upholstered and sprung at each corner, with guides to prevent side play, similar to the Tynesider. A three or four-speed gear box is a *sine qua non*, particularly when riding in a hilly district on narrow roads, where one is likely to be baulked when climbing.

The passenger should sit as close as possible to the driver, but as there is more play in the saddle than obtains with the pillion seat a margin of one or two inches between the driver and passenger should be allowed for, so as to prevent undue wear and tear when pot-holes are encountered.

On no account should the passenger be much heavier than the driver: the lighter she is the easier will be the steering.

The driver should wear a strong leather belt, and insist upon the passenger holding it. The passenger should deprecate any kind of swank on the part of the driver, such as indulging in unnecessary bursts of "high" speed,



accompanied by much wobble, sound, and dust. These "all out" stunts frequently finish up "all in" before the "beak" for loitering or what not. Better by far try to convince Lottie that your "grid" is some 'bus and that you are some driver by frying the breakfast bacon on your cylinder head when you arrive home in time with the milkman. It is surprising what an early Rex will do if humoured a bit! Other forms of swank consist of the passenger disdaining to hold the belt of the driver, with the result that a bad pot-hole unexpectedly encountered unseats her and the law of gravity sees to the rest. Then there is the "knot" with the extra wide handle-bars on a baby two-stroke steering with one hand only whilst he deftly flicks the ash from his woodbine with the little finger of the other hand. Also has the reader noticed the effect of certain freakish drain pipe exhausts on the passenger's light summer-go-to-meeting dresses, etc.? The *basso profundo* growl of the angry exhaust may possibly imbue her with a certain respect for the enormous amount of reserve power it suggests, but all respect at once vanishes immediately she discovers the appalling truth that her trousseau has been hopelessly ruined by "that horrid smelling thing." Moreover, she may probably wish to borrow a pint of "juice" for cleaning purposes.

VIC.

Golder's Green.

### CHANGE TO MORE POWER.

Sir,—I have read *The Motor Cycle* ever since I started motor cycling five years ago, and have marked, since the war, the number of your readers who have left their first mounts for something else, usually on a bigger scale. I began with a 6 h.p. sidecar machine, and have been driving a motor 'bus now for over two years.

ANNIE BALCHIN (Mrs.).

### BALL BEARING CONNECTING RODS.

Sir,—In following the animated discussion of the above, it appears to me that not a few of your correspondents fail to embrace as a whole all the forces operating on the piston. In your issue of the 19th ult., Frederic Strickland compares the motion of the pistons in a rotary engine to that of a ball being whirled in a circle at the end of a piece of string, and asserts that in his experience the string always remains taut. May I ask him a question? If the ball at every other revolution received a blow in a direct line with the string (representing the explosion in the cylinder), would the string always be taut?

In his example the string remains in tension, yet a moment's consideration will reveal to him the fact that the connecting rods in a rotary engine are under compression during three of the four operations in the cycle, viz., compression, explosion, and exhaust, and are in tension during the suction stroke. It is this change from compression to tension that gives the reciprocating effect to the bearings. I say "effect," being fully aware that the pistons do "actually" reciprocate along the cylinders.

PERCY J. FOSTER.

### AVERAGE SPEED.

Sir,—As an appreciative reader of your splendid paper for twelve years, I am tempted to write to you on a subject which has always been much debated by motor cycling friends and myself. I refer to the average speed of various types of motor cycle, so interestingly discussed in your issue of July 19th by "The Critics," whose articles are, after Occasional Comments, most eagerly read by me when I get your paper, which is sent out to me every week.

In civil life I suppose I cover about as many miles weekly as anybody, as business alone takes me something like 750 miles per week on an average, and on several occasions I have finished up the week with a distance of 1,000 miles to my credit, or, should I say, to the credit of the various machines I have owned.

I had a 1911 two-speed  $3\frac{1}{2}$  h.p. Humber, which carried me 59,000 miles, and though this was rather slow, being very heavy, I have frequently travelled from Hungerford to Reading, twenty-six miles, in forty minutes.

But the best machine I ever owned, alike from the point of view of reliability, cheapness of running, comfort, and high average speed, was my old 1914 4.5 h.p. model C Zenith. On this machine, which I sold with 31,000 miles to its credit, I once did 284 miles in eight hours fifty minutes, including all stops, three for petrol and one for a meal. Of course, I did this from necessity, it being

imperative that I should return to Reading in time to catch a friend who was leaving that town. I might mention that from York to Hatfield I was on the Great North Road, but prefer to suppress any further details for various reasons. On this run I raced and beat a very hot 15.9 h.p. Straker-Squire in a scrap which lasted twenty-two miles. I might also mention that I got very badly left by the rider of a T.T. Scott on a hilly portion of my route, for, though I could give him more than he wanted on the flat, up hills with sharp corners he was easily "all over me."

Speaking of shorter distances, a certain nine miles of beautiful Tarmac (for it was *avant la guerre*), very well known to Reading motor cyclists, I used regularly to cover in eleven minutes, but then this road is practically dead straight and flat, and there are no villages or other obstacles to speed.

On the whole, I think your "Critics" are not far wrong in the conclusions at which they arrive, for I used to reckon that my average for the whole of my daily wanderings, reckoning, of course, only actual travelling time, worked out at about thirty-one miles per hour. I used to keep an accurate daily chart of my mileage, and I could usually estimate time spent during stops pretty accurately, because, though I did not pay my calls by appointment, I had certain times when I knew I could certainly find my clients at home.

There has been much argument here amongst our motor cyclists regarding the speed of which their Triumphs and Douglasses were capable. I will not mention how the matter was finally settled, for fear the "powers that be" might enquire anxiously if we have nothing better to do, but I will say this: the motor cyclists were very disappointed. Which goes to prove that the "D.R." was quite right in saying, "The average rider has an enormously exaggerated notion as to the maximum speed on the level that his machine will attain."

In case anyone should think from my unstinted praise of the Zenith that I have an axe to grind I would like to conclude by saying that I have no financial interest whatever in the firm.

If one of the other motoring papers which are sent out to me fail to arrive I try to take it as philosophically as possible, but if *The Motor Cycle* is missing, oh! what a moan!

I trust I have not encroached too greatly on your valuable space, and hope for a speedy return of the good old days on the open road with something that can shift between one's knees.

ELDON.

B.E.F.

### SIDECAR AND REAR LIGHTS.

Sir,—We read with pleasure and interest "Glow Worm's" letter appearing in your issue of July 26th. He is good enough to refer to the Voltalite as a wonderful little machine.

There is one warning, however, we would like to give your readers who may be induced, on "Glow Worm's" recommendation, to make use of the pedal cycle Voltalite on a motor cycle, and that is, that the pedal cycle Voltalite, though thoroughly strong and reliable for the ordinary push bicycle, is not, according to our standards, sufficiently substantial for a motor cycle; and though it is a tribute to the Voltalite that it is working so well on a number of motor cycles and sidecar attachments, we do not think it desirable, in view of the vibration and high speed of the motor cycle, to fit the pedal cycle Voltalite.

We manufacture a special Voltalite fitted with Hoffmann ball bearings for motor cycle use, and it would be better if this were used.

We do not think we are giving any secret away when we inform your readers that we have ready for prompt supply after the war an improved model of motor cycle Voltalite, which will illuminate head lamp, side lamp, and tail lamp. It has none of the complications of the accumulator charging generator, but it will permit of the light being turned on when the motor cycle engine is not running.

As "Glow Worm" states, he does not know us, we do not know him, but we would like to express our thanks to him for his kind appreciation of the Voltalite, which we can assure him is absolutely British in manufacture and design.

WARD AND GOLDSTONE.

Many interesting letters are unavoidably held over owing to lack of space.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of the envelope, and should be kept distinct from questions bearing on technical subjects.

## Storing Tyres.

Having got a new B.S.A., and being unable to obtain petrol, I should be pleased to know which is the best way to keep the tyres in good order while being stored.—S.R.

The best way to keep the tyres in order is to remove them from the machine and to hang them in the dark in a damp place. Inner tubes may be placed in a box with French chalk.

## Lubrication.

I have an Enots oil pump fitted to my machine, and have noticed my oil will not turn off. Even when the valve is closed down on to its seating the oil continues to drip, but only when the machine is running. On taking the pump out of the tank, I noticed that the wire gauze, which is fitted in the bottom of the pump, is missing. Is this the cause of the trouble?—R.E.T.  
No; the absence of a wire gauze is not the cause of the trouble, which is probably due to the needle valve not being a good fit, being in need of grinding in. This can be done with very fine emery powder and thin oil.

## Lighting Regulations.

(1.) Am I obliged to have two head lights, one on the motor cycle and the other on the sidecar? (2.) What is meant by a reduced light on an acetylene head light? (3.) What is the size of glass one is permitted to have? What is the farthest distance the light must reach? (4.) If the light is turned or reduced low, is this sufficient with the glass partly, not fully, obscured? I have been held up by the police for the above. I previously made enquiries, but was told I did not need a lamp on the sidecar, and if the head light was reduced I was in order.—J.W.G.

(1.) Yes, you have to carry a lamp on the sidecar as well as a head light on the motor bicycle, to show the width of the vehicle. (2.) Painting the glass with a coat of white paint or pasting a sheet of tissue paper on the outside. (3.) The glass must not exceed six inches in diameter. The farthest distance the light must reach is not stated outside the Metropolitan area. (4.) The whole glass of a motor cycle head light must be obscured in the manner mentioned above. By turning the light low you would probably experience a smoky flame and burner trouble.

## Carburettor Adjustment on Two-stroke.

As an old-time cyclist well past middle life who has recently taken to motor cycling, I should like to have your kind assistance.

On a reliable two-stroke fitted with a Senspray carburettor I find that the engine will not fire evenly unless the gas lever is advanced to about level with the air lever when fully open. These positions give a speed much too fast for my liking. The size of the jet is 28.—J.W.R.

We doubt if you will be able to remedy the trouble of which you complain, because a two-stroke engine is not so flexible as a four-stroke, and it is often difficult to throttle down with it. You might try the effect of a larger jet, which would give a stronger mixture at slow speeds, but would probably increase the petrol consumption.

## IMPORTANT NOTICE.

### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

## An Electric Cycle.

(1.) Is it possible to use an electric motor with accumulator as motive power on a push cycle, and if so, what voltage, etc., would be necessary for such a motor? (2.) Would it be possible to generate sufficient power by a dynamo while pedalling to refill the accumulators for the motor? (3.) What would be the approximate mileage obtainable on one charge, and what m.p.h.?—E.M.S.

(1.) It is possible to use an electric motor for the purpose of propelling a pedal cycle, but the great weight of the accumulator renders the idea impracticable. (2.) This would be quite impossible, and if it were possible it would entail a great waste of energy. (3.) We doubt if you could get much more than ten miles on a charge, while the speed would depend upon the size of the motor fitted. It is really not worth going into figures as to the voltage and size of the motor, as the idea cannot be put into practice.

As early as 1901 a racing tandem was fitted in this manner, and was only suitable for use on the track or for very short sprints.

## Two-stroke Lubrication.

I have a Royal Ruby two-stroke 2½ h.p. It has run well up to the last week or two, and the engine did not get hot until I had run twenty or thirty miles.

Now it gets hot if I run one and a half miles and stops, and will not pull me until I have let the engine cool about four minutes. I have cleaned the carburettor and removed the carbon from the cylinder; also seen that there is no air getting to the petrol. This machine is oiled from the petrol tank, and I would like to know how much lubricant I should mix with the petrol. I have been putting one gill to every gallon of petrol.—L.E.

It is practically certain that your trouble is due to an insufficient quantity of lubricating oil. The correct proportion should be half a pint of oil to one gallon of petrol. If the trouble is not cured, after increasing the supply to the quantity stated above, we should recommend you to make sure that the vent in the tank filler cap is not stopped up.

## Chain Lubrication.

I should be very glad if you could tell me of any preparation that I could put on the chains of my motor cycle. I use sticks of graphite and grease mixed.

This is all very well for about six miles, but the stuff soon flies off. It is quite suitable on a cycle chain which revolves comparatively slowly, but on a motor cycle chain the speed of the revolutions throws all the stuff off in a very few miles. It seems to me that these chains require a more sticky and tenacious grease. I shall be glad to have your advice, as the chains run so much more smoothly when they have grease on them. My trouble is that it will not last on them long enough. As the chains have stretched I cannot now use the chain cover, and there is no room to shorten them by removing half a link, so they are exposed.—H.N.

Wash the chain in paraffin, and leave it to soak all night, and then plunge it into a bath of Russian tallow, which has been melted on the fire. This works the grease into all the links and bearings, and lasts for some time. When chains are entirely exposed they should be kept dry—that is, lubricated with a stiff grease rather than with a wet oil.



### An Accident.

**?** Recently I was in a collision between a car and my motor cycle in the following circumstances: I was proceeding along the Great North Road, going north. Just as I approached a by-road a car appeared, entering on the left, coming off the by-road on to the main road, along which I was travelling. I swerved to the right to allow the car to come on to the main road and pass me on its way south. But the car crossed straight over the road and collided with me on the grass. The insurance firm with which the car is insured claim from me for damage to the car, alleging negligence. Must I pay them? Can I legally claim damages from the driver of the car, or from anyone? (The driver was not the owner.) Had the car turned in, I have every reason to believe I could have got round it, but could not have cleared it by going straight on.—E.J.G.

Judging from your account of the accident, we do not think you can be held liable for the damage to the car, unless you were going too fast. On the other hand, we think you would be unlikely to succeed in any claim for damages from the owner of the car. The affair seems to have been a pure accident.

### Carrying a Gun.

**?** Would any of the readers of *The Motor Cycle* instruct me how to make a place suitable for carrying a gun in its case on the carrier of a motor cycle—I suppose that there is no room for so bulky an article elsewhere but on the carrier? I should want some kind of wooden bracket arrangement if possible, for I do not wish the gun case to be knocked about. Also I should like to know if a gas bag of suitable size can be carried on a motor cycle, by which to drive the engine for, say, ten miles without replenishing? Is it a practical arrangement for successfully driving a motor cycle—for short distances only, of course? Is there any good substitute for petrol which does not require a licence or permit to buy?—ENQUIRER.

The ordinary pattern gun case would be rather bulky to take on the carrier of a motor cycle. The best plan is to make a special waterproof carrier, and attach it in a vertical position to the spring portion of the front forks. It will then be saved a good deal of jolting. There is, however, a gun case which takes far less room than the ordinary pattern. This type is known as the Shikari, and can be obtained from the Army and Navy Stores, 105, Victoria Street, London, S.W.1. This, we think, could be carried lengthwise on the carrier, and if there were a slight overhang at the back it would not matter greatly. We fear that it is not practicable to run a motor cycle from the contents of a gas bag. In the first place, a bag to hold enough gas to propel the machine for ten miles would be very bulky, and also with coal gas the engine would not give so much power as with petrol, and would probably overheat. We are sorry to say that we do not know of a single substitute which can be purchased without being entered on a petrol licence.

### Piston Rings.

**?** (1.) What is the capacity of a 1909 Triumph petrol tank? (2.) Would an engine necessarily have more power with a piston fitted with three rings than two?—H.P.

(1.) The tank in question holds one and a half gallons of petrol. (2.) An engine with two piston rings will be more efficient than one with three piston rings on account of reduced friction. Three piston rings, however, would hold the compression for a longer time.

### Water-cooling.

**?** I have a Zenith-Green. Owing to radiator troubles, I recently sent the copper jacket and cylinder complete to the makers for reswearing, etc. I found, on receiving it back, that the cylinder was apparently a new one, though the clearance when using my old piston in it is about .005in. or so, which I gather should be ample. As a solo mount my bicycle is all that could be desired, the kick and life being remarkable. Now—although I never had any trouble when running with sidecar before the above alterations—it boils up disgracefully at the slightest provocation, losing lots of water. The sidecar is lined up correctly, and the exhaust ports are free and clean, no baffles being used. Circulation takes place in the radiator. Could you please give me any remedy for this trouble?—A.B.

We should say that the trouble is probably due to the fact that the new cylinder requires to be run in for a little time. In due course the trouble should disappear. You say that the circulation takes place in the radiator, but are you quite sure that it is absolutely unrestricted? We think you ought to investigate matters a little more closely and see that all passages are quite free and clear.

### Timing a Small Twin.

**?** I have a 2½ h.p. Moto-Rève twin-cylinder motor cycle, but cannot get it timed up rightly, everything else being in order. Could you advise me as to the best (a) valve timing, and (b) ignition timing for an engine of above make? I have now got it timed as follows: Exhaust valves begin to open when piston is about 2 mm. from the bottom of firing stroke, while the ignition is timed on dead top of compression stroke, with magneto two-thirds retarded. I can only get one muffled explosion every time exhaust valve lifter is dropped. Do I time the ignition to the first or second cylinder?—L.B.

Your valves should be timed as follows: Set the exhaust valve to close just after the completion of the exhaust stroke. It will then commence to open when the piston is about one-seventh of the length of the stroke from the bottom of the firing stroke. The inlet should commence to open as the exhaust closes, and remain open for one complete stroke of the piston, or while the flywheels turn through 120°. We would recommend the following magneto timing: Place the

piston exactly on top of the compression stroke, and connect up the magneto with the points just about to break, and the ignition lever two-thirds retarded. This will mean that the explosion, when the ignition is fully retarded, will take place when the piston has travelled about 1.5 mm. down the firing stroke. Your trouble is probably due to some magneto defect. The back cylinder is probably No. 1.

### READERS' REPLIES.

#### Lubricating the Gear Box.

I noticed in your reply to "T.P.L." that you answer: "Thick grease is quite satisfactory for gear box lubrication"—a fact with which I quite agree, but must point out that the B.S.A. gear box also encloses a multiple plate clutch designed to run in *thin* oil (B.S.A. gear oil), and that the use of any oil thicker than the oil recommended must lead to excessive clutch slip. With my own machine even the use of engine oil turned out a failure and necessitated washing out with petrol (in war time) and filling up with Singer sewing machine oil (gear oil being temporarily unobtainable). Hoping your correspondent does not slip his clutch (and admit the thick grease between the plates thereby).—ALEX. LACEY.

#### Flywheel Loose.

Riders of two-stroke lightweights may like to know that the same thing happened to me as was described by "J.C." in a query of your issue of July 26th. The engine pulled up, owing to the flywheel becoming loose, and could not be restarted until tightened up, when it went right away.—E.P.H.

### RECOMMENDED ROUTES.

#### BIRMINGHAM TO BARMOUTH.—L.N.

Birmingham, Stourbridge, Bridgnorth, Much Wenlock, Shrewsbury, Welshpool, Llanfair Caereinion, Dinas Mawddwy, Dolgelly, Barmouth.

#### BIRMINGHAM TO CLEVEDON.—L.N.

Birmingham, Bromsgrove, Droitwich, Worcester, Tewkesbury, Gloucester, Berkeley Road, Alveston, Filton, Clifton Downs, Suspension Bridge, Clevedon.

#### COVENTRY TO GRASSINGTON (YORKS).—A.L.

Coventry, Lichfield, Armitage, Abbots Bromley, Uttoxeter, Ashbourne, Harlington, Buxton, Chapel-en-le-Frith, Glossop, Stalybridge, Ripponden, Halifax, Keighley, Addingham, Bolton Bridge, Burnshall, Grassington.

#### CHATHAM TO CATTERICK.—F.C.G.

Chatham, Gravesend, ferry to Tilbury, Brentwood, Chipping Ongar, Harlow, Ware, Buntingford, Royston, Caxton, Huntingdon, Stilton, Stamford, Grant-ham, Newark, East Retford, Doncaster, Ferrybridge, Aberford, Wetherby, Boroughbridge, Leeming, Catterick.

#### WOKINGHAM TO DERBY.—S.T.

Wokingham, Reading, Pangbourne, Streatham, Wallingford, Dorchester, Oxford, Banbury, Southam, Coventry, Hinckley, Ashby-de-la-Zouch, Derby.



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**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd., and crossed & Co.**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000; c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

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### A.J.S.

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**RIDER TROWARD'S**, 31 and 78, High St., Hampstead.—A.J.S., 6 h.p., with sporting sidecar, disc wheel; 49 gns. [6287]

**1916 A.J.S.**, 3-speed, clutch, kick starter, fine running order throughout, complete, all accessories; £50.—P., Marine Hotel, Selsey. [6207]

**2 1/2 h.p. 1915 A.J.S.**, smart lightweight, includes Lucas accessories, h.h.c. clutch, and kick starter; £45.—Wanchope's, 9, Shoe Lane, London. [6321]

**A.J.S.**, 1915, 2 1/2 h.p., 3-speed, clutch, T.T. bars, P. and H. head lamp, generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.I. [4203]

## FASTENER FAULTS

If the fault simply ended with the fastener, then they would count for little, BUT—

Seeing that the failure means, perhaps walking miles, perhaps effecting on the roadside that which always must be a dirty repair—in fact, a "hold-up" anyway—it's worth considering which is "The Fastener that never fails."

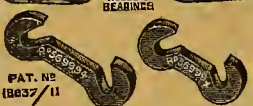
We make that claim and stand or fall on it.—

Here are two of our models.

The FORWARD, 1/6.



The KING HOOK.



Detachable, 1/-. Adjustable, 1/3.

Ask for Catalogue of others.

Forward Motor Co.,

35, Forward Works, Summer Row, Birmingham.

## 'Hints and Tips for Motor Cyclists.

Brimful of useful information.

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Home or abroad.

ILIFFE & SONS LTD., 20, Tudor St., E.C.4.

## IGNITION and Car Lighting Experts.

Our Service combines thorough knowledge—best materials—perfect fitting—prompt attention—quick despatch—moderate charges.

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## MOTOR CYCLES FOR SALE.

### A.J.S.

**6 h.p. 1914 A.J.S.** Combination, powerful twin-cylinder engine, 3-speed gear and kick starter, h.h.c. clutch fitted with roomy coachbuilt sidecar, all tools, accessories £67/10.—Wanchope's, 9, Shoe Lane, London. [6322]

**A.J.S. 1914 6 h.p.** Gloria Combination, hood, screen speedometer, best Lucas accessories, petrol can luggage grid, tool chest at rear of sidecar, a glorious outfit; £75; closed for the holidays from Monday August 6th, until Friday, 10th.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6330]

### Alldays.

**COLMORE** Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [079]

**ALLDAYS** Allon, 2-stroke, 2-speed, new, just come from works; £40.—Sanders, 39, Bridge St., Castleford. [X346]

**ALLDAYS** Allon, 2-stroke, 2 speeds, absolutely new exceptional bargain, £35.—Apply, Belgian Bureau 52, Regent St., W.I. [626]

**1917 Alldays** Allon, 2-speed, 2 1/2 h.p., Lucas horn speedometer, etc., complete; joining up; acquires offer £45 accepted; seen London.—Box L4, 192, of The Motor Cycle. [625]

**1917 Alldays** Allon de Luxe, clutch, kick starter, 2 speed, spring frame, tools, not ridden 500 miles perfect, unscratched; £48, no offers.—Leathers Co., Ltd. Atrincham, near Manchester. [X354]

**ALLON** 2 1/2 h.p. 2-stroke Motor Cycle, £39/13, or 0 extended payment terms, deposit £7/14, and 1 monthly payments of £2/13; 2-speed and other model also supplied.—Harrods Stores, Ltd., 118, Brompton Rd. London, S.W.1. [633]

### Ariel.

**ARIEL**, 3 1/2 h.p., 1917, 3-speed countershaft model in stock.—Crown Bros., Guildford. [256]

**COLMORE** Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [079]

**ARIEL**, 1914, 5-6 h.p. twin, countershaft 3-speed, h.c. starter, 2-seater sidecar, all on; £49; perfect.—Seen at 3, Tewkesbury Terrace, New Southgate, up to 10th inst. [627]

### Auto-Wheels.

**AUTO-WHEEL** and gent's cycle, late 1914, splendid condition; £16.—80, Parkinson Lane, Halifax. [X358]

**CHATER-LEA** Lady-back Tandem, 21-24, 3-speed with standard Auto-Veech, just arrived; price of application; closed for the holidays from Monday, August 6th, until Friday, 10th.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [630]

### Bat.

**6 h.p. Bat-Jap**, Bosch, Millennium speed gear, F.E. with sidecar, faultless; £25.—93, Brighton Rd. Surbiton. [X356]

**BAT**, 7-8 h.p., Canelet sidecar, excellent condition; bargain; full particulars on application.—F. J. Wilson, Stokesley, Yorkshire. [X354]

**7-9 h.p. Bat-Jap**, chain drive, with Gloria sidecar, perfect running condition; £45, or near offer.—Lamb, 6, Chester Terrace, Sunderland. [622]

**BAT-J.A.P.**, late 1915, 7-9 h.p. combination, coach built, twin sidecar, M.F., 3-speed, clutch, all spare Cowley speedometer, etc.; offers wanted.—Sinker, 7 Domestic St., Leeds. [621]



## MOTOR CYCLES FOR SALE.

## Bounds.

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—Bounds-Jap 6h.p. 3-speed countershaft built combination, special engine, winner 22 first class, has done 75 m.p.h. with sidecar, in perfect condition; 69 gns. [6286]

## Bradbury.

16 Bradbury Combination, 6h.p., 3-speed countershaft, kick start, speedometer, etc., grand condition; highest offer secured; owner joining up.—Box 178, c/o The Motor Cycle. [6226]

RADBURY, 1913, 4h.p., Canoelet C.B. sidecar, N.S.U. 2-speed, F.E., thoroughly overhauled, little oil, complete with accessories; £34, or exchange for cash for high-class 6h.p. twin.—Fisher, Chemist, Chad Rd., South Norwood. [6143]

## Brown.

BROWN, 3½h.p.; £16.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6049]

## B.S.A.

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798]

174 B.S.A. Countershaft Combination; £75; ridden 450 miles.—A. Jeavons, Lya, Stourbridge. [X3552]

S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0838]

S.A., 1916, 3-speed countershaft combination, best model, Swan sidecar, all complete, speedometer; —10, Langley Rd., Catford. [6219]

15 B.S.A., 4½h.p., all chain drive, and coachbuilt sidecar, upholstered in Bedford cord, Lucas motor lighting and horn, absolutely perfect.—Elce and 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491]

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—1916 B.S.A. 3-speed, as new, 54 gns.; A. coachbuilt combination, as new, mileage under 0, 62 gns.; 1913 T.T. B.S.A., 2-speed, 29 gns. [6294]

## Calthorpe.

CALTHORPE, 1916, 2-speed, 2½h.p. Calthorpe-Jap; £32.—10, Langley Rd., Catford. [6218]

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

16 Calthorpe-Jap, 2 speeds, splendid condition.—Dixon, Hawthorns, Ironbridge, Salop. [X3391]

15 2½h.p. Calthorpe-Jap, Enfield countershaft 2-speed gear; £26/10.—Motor Exchange, Horton Halifax. [6116]

R. Sale, 1916 Calthorpe-Jap 2½h.p. motor cycle, 2-speed, 4-stroke, little used; price £28.—Capt. J. Military Hospital, Bulford. [6267]

CALTHORPE-J.A.P., 1915, 2-speed, 2½h.p., only used 6 months, owner at sea, £28/10; also three d new 1917 models actually in stock; closed for holidays from Monday, August 6th, until Friday, —Lamb's, 151, High St., Walthamstow, and 50, 1 Rd., Wood Green. [6304]

## Clyno.

YNO 1915 6h.p. Coach Combination, detachable and spare wheels; £69/10.—Motor Exchange, Horton, Halifax. [6115]

YNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham and Chester; inclusive price with spare wheel, 100 gns. [0884]

## Coventry Eagle.

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—1917 new Coventry Eagle, 2-speed, in stock; —. [6284]

VENTRY Eagles, strongly built, reliable, and attractive machines, fitted with Villiers 2½h.p. 2-a engine, Brampton forks, pan saddle, 2 footlugs, extended payment terms, deposit £7/8, and 12 monthly payments of £2/10/7.—Harrods Stores, Ltd., Brompton Rd., London, S.W.1. [6331]

## Dalm.

LM, 1915, 2-stroke, nice machine, as new; £20.—7, Northcote Rd., South Norwood, S.E. [6220]

16 Dalm, 3h.p., 2-stroke, perfect condition, and all accessories; £22.—Watson, Letchford (Without), Lington. [6212]

## Douglas.

UGLAS, 1911, 2-speed; £23.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6046]

UGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

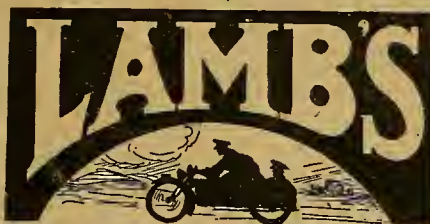
11 Douglas, 2 speeds, recently renovated, wants tuning; £17.—Cross, Jeweller, Rotherham. [X3546]

UGLAS, new condition, all extras, motorizing suit, etc.; £30.—Miss E. Holland, Eastry, Kent. [X3547]

UGLAS, 1914, 2-speed, Philipson pulley; £45.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6047]

UGLAS: prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Il. Tel. 50. [5855]

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of all motor cycles. [0800]



## NEW MACHINES ACTUALLY ON SHOW.

ENFIELD 1917 6 h.p. 2-sp. Outfit	£115	0
ENFIELD, 1917, 2½ h.p., 2-speed, 2-stroke	£44	2
ROVER, 1917, 3½ h.p., 3-speed counter-shaft Combination, with Sidecar	£99	4 6
JAMES, 1917, 3½ h.p. twin, 3-speed	£69	10
JAMES, 1917, 4½ h.p., No. 6, 3-sp. Comb.	£87	2
ARIEL, 1917, 3½ h.p., 3-sp. Combination	£93	10
LEVIS, 1917, 2½ h.p., 2-sp., Model E	£47	10
ALLDAYS ALLON, 1917, 2½ h.p., 2-speed, hand clutch	£47	5
ALLDAYS ALLON, 1917, 2½ h.p., 2-speed, no clutch	£44	2
ALLDAYS ALLON, 1917, 2½ h.p., 3-speed	£37	16
CALTHORPE-J.A.P., 1917, 2½ h.p., 2-sp., Enfield Sidecar	£39	16
CALTHORPE-J.A.P., 1917, 2½ h.p., 2-sp., with Sidecar	£50	0
ROYAL RUBY-J.A.P., 1917, 2½ h.p., 2-sp.	£46	0
ROYAL RUBY, 1917, 2½ h.p., 2-sp., 2-str.	£40	10
ROYAL RUBY, 1917, 2½ h.p., single-speed	£32	10

## SECOND-HANDS.

ENFIELD 6 h.p. coach Combination, 2-sp., all accessories	£48	10
ENFIELD 1916 6 h.p. dynamo lighting Combination, hood, screen, speedometer, horn, condition very fine	£110	0
ENFIELD 1916 6 h.p. Combination, 3 lamps, hood, screen, Cowey speedometer	£84	0
ENFIELD 1916 (late), 6 h.p. Combination, 3 lamps, horn, mileage under 1,000, condition indistinguishable from new	£98	10
ENFIELD, 1917, 3 h.p. twin, semi-T.T. model, with sporting Canoelet Sidecar, Stewart warning horn, 2 Lucas lamps, full kit tools, only ridden 3 or 4 times, indistinguishable from new	£69	10
ENFIELD, 1916	£80	0
MATCHLESS, 1915-16, 8½, 7 h.p. Combination, Lucas accessories, child's seat on rear, petrol carrier, and luggage gr'd. Thoroughly fine lot	£95	0
HARLEY-DAVIDSON 11F Combination, bought new in 1916, fully equipped	£75	0
INDIAN, 1915-16, 7-9 h.p., clutch model, T.T. bars, disc wheels, with lamps, horn, and large exhaust whistle, condition quite equal to new, ridden approx. 1,000 miles	£55	0
INDIAN, 1915-16, 5 h.p., 3-sp. Combination with accessories, tyres unpunctured, enamel unscratched, semi-T.T. bars, very pleasing outfit	£58	10
TRIUMPH, 1913, 3½ h.p., 3-speed, semi-T.T. bars, a nice little solo mount	£35	0
TRIUMPH, 1913, 3½ h.p., 3-speed Combination, with lamps, horn, and usual acc.	£48	0
TRIUMPH, 1917, 3½ h.p. model, fixed gear, semi-T.T. bars, and accessories	£20	0
TRIUMPH, 1914, 4 h.p., 3-speed Sturmeys-Archer gear, lamp, horn, speedometer, windscreen, Millford Sidecar	£48	10
ALLON 1916 model, 2½ h.p., single speed outfit, just overhauled by makers, complete with accessories	£25	10
ALLON 1917 model, 2½ h.p., 2-speed, hand clutch, full kit tools, and Stewart warning horn, ridden 200 miles only, and absolutely like new	£43	0
NEW HUDSON, 1913, 3½ h.p., 3-speed Combination, with lamp, horn, speedometer, machine in extremely good order for 1913 machine	£39	10

Several Sidecars, to suit various machines.

WANTED.—Up-to-date OUTFITS. We are always prepared to purchase, at highest possible prices, first-class turn-outs.

Easy Terms by arrangement. Exchanges. Liberal allowances.

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Only depot in this district.  
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Hours—9 to 5.  
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## MOTOR CYCLES FOR SALE.

## Douglas.

4 h.p. Douglas, 1915, just overhauled, 3-speed, clutch, new Dunlops, chain-belt, rings, etc.; £60.—Wallis, Castla Donington, Derby. [X3387]

1913 Douglas, 2-speed, clutch, and kick start, excellent condition throughout; cheap for cash.—Garnett, Mill Farm, Shackerston, Atherstone. [X3526]

DOUGLAS, 1915, 4h.p., 3-speed, new Dunlop tyres, usual accessories, not ridden last 12 months, condition excellent; £50; evenings after 7.—33, Spencer Av., Bowes Park, London, N. [6352]

4 h.p. Douglas Combination, kick starter, late 1914, excellent condition, spares, equipped, 6 gallons petrol; seen any time; trial or expert examination allowed; £47 for quick sale.—98, Tulse Hill, S.W.2. [6349]

DOUGLAS, 2½h.p., W.O. Model, complete with head and rear lamps, generator, and horn, in splendid mechanical condition and good order; £45; extended payments arranged.—Harrods Stores, Ltd., Motor Showrooms, 118, Brompton Rd., S.W.1. [6338]

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—Douglas, 4h.p., 3-speed, clutch, kick start, coachbuilt sidecar, 69 gns.; 1916 W.O. 2-speed Douglas, as new, 43 gns.; 1914 2-speed Douglas, 35 gns.; 1913 2-speed Douglas, 31 gns. [6279]

DOUGLAS, 1913 T.T., overhauled, new piston and rings, Binks 3-jet carburettor, with small jet giving low petrol consumption, tyres in good condition, if required; £25, or near offer, ridden by officer R.F.C.—C. c/o Mason, 398, North End Rd., Waltham Green, S.W.6. [6277]

2½h.p. Douglas, absolutely new; immediate delivery of models U, V, W, clutch. Kick start, against priority permits, for doctors, farmers, war and aviation workers, etc. How and where to apply.—For full particulars write to the Douglases Specialists, Robinson's Garage, Green St., Cambridge. Tel.: 388. T.A.: Bicycles. [6312]

## Edmund.

EDMUNDS, 2½h.p. J.A.P. engine, special spring frame, Royal Enfield 2-speed gear, double tank; £50/8; extended payments arranged.—Harrods Stores, Ltd., Motor Showrooms, 118, Brompton Rd., London, S.W.1. [6336]

## Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2½h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838]

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801]

ROYAL Enfield, 3h.p., double-cyl., kick start, 2-speed, new this spring, very little used, good as new; £53.—Waters, 12, Shrewsbury Rd., Redhill, Tel.: 73. [6248]

ENFIELD, 1913-14, 3h.p., 2-speed, F.E., usual accessories, £22/10; would exchange for higher powered machine, with cash adjustment.—Thorpe, Cranleigh, Surrey. [6235]

ENFIELD 6h.p. Combination, new October, 1915, hood, screen, Watford speedometer, Lucas best horn, splendid condition; best offer; owner called up.—Pascall, Draper, Stoke, Devonport. [X3463]

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—Enfield 1917 combination, standard, as new, 87 gns.; 1916 ditto, unscratched, 83 gns.; 1915 3h.p. Enfield, 32 gns.; 1916 Enfield, 2-stroke, 29 gns. [6280]

ENFIELD.—Actually here, brand new 1917 Enfield 6h.p. outfit; also 1917 2½h.p. 2-speed 2-stroke, £44/2; also 1916 early standard combination, at £80; also 1916 6h.p. combination, indistinguishable from new, £98/10; also 1916 dynamo lighting model, hood and screen, £110; 1917 3h.p. T.T. model and sporting sidecar, heap accessories, £68/10; also another 6h.p. combination, with all accessories, and family sidecar, £48/10; exchanges, easy payments by arrangement.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6298]

## Excelsior.

EXCELSIORS.—All models in stock; magneto model £75, electric lighting model £85; get a big X. You'll be satisfied.—Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester. [X1466]

## F.N.

5-6h.p. 4-cyl. 1912 F.N., 2-speed, Bosch, very good tyres; nearest offer £17.—Jones, Motor Dealer, Efailwyrdd, Pwllheli. [X3543]

## Harley-Davidson.

HARLEY-DAVIDSON, 1915, Swan sporting sidecar, dynamo lighting; £64.—Renier, 13, May Rd., Twickenham. [6256]

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802]

1916 7-9h.p. Harley-Davidson Combination, in perfect condition, lamps, horn, etc.; £89.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552]

HARLEY-DAVIDSON, 1915, 7-9h.p., in thoroughly good condition and appearance; £60.—Longman Bros., King St., Acton. \*Phone: Chiswick 178. [6316]



## MOTOR CYCLES FOR SALE.

## Harley-Davidson.

LATE 1916 7.9-h.p. Harley-Davidson Combination, electric lighting, had very little use, like new throughout: £80.—W. Shelton, Ivy Mount, Ingleton, Yorks. [X3388]

1916 Harley-Davidson 7.9-h.p. Combination, electric model, fully equipped, new Dunlop covers, in perfect condition throughout: 85 gns., or close offer.—Howley, Derizes. [6341]

HARLEY-DAVIDSON, a 1915 beautiful combination, with 3 lamps, horn, and many spares, condition perfect: £25; closed from Monday, August 6th, until Friday, 10th.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6299]

HARLEY-DAVIDSON 1917 Electrically Equipped Combination, speedometer, hood and screen to sidecar, only run 200 miles; originally sold for £145, accept £130 cash, or plus 2% extra for deferred payments.—Wm. Whiteley, Ltd., Queen's Rd., W. [6251]

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—Harley-Davidson, 1916, dynamo lighting combination, as new, 87 gns.; 1916 standard Harley combination, as new, 83 gns.; 1915 dynamo lighting combination, 69 gns.; 1915 standard combination, 65 gns.; 1915 T.T. 7.9-h.p. 3-speed model, clutch, kick start, 59 gns.; all fully equipped. [6281]

## Humber.

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

31 h.p. Magneto Humber, spring forks, belt drive; £24/10.—Motor Exchange, Horton St., Halifax. [6117]

1914 3 1/2 h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863]

## Indian.

1912 4 h.p. Single-cyl. Indian, 2 speeds, free engine; £23/10.—Motor Exchange, Horton St., Halifax. [6118]

LATE 1915 7.9-h.p. 3-speed Indian Combination, spring frame; £60.—785, High Rd., Leytonstone. [6344]

1915 7.9-h.p. Combination Indian, electrically equipped, speedometer, like new; £75.—Stott, Newcombe St., Elland. [6274]

INDIAN Combination, 1915, 5.6-h.p., very little used, and in absolutely top hole condition: £58.—Longman Bros., King St., Acton. Phone: Chiswick 1578. [6317]

5.6-h.p. Indian Motor Cycle, 1915, and coachbuilt sidecar, in good order, and fully equipped, Binks carburetter; £65.—Peelies Motor Co., Ltd., Edinburgh. [X3576]

INDIAN Motor Bike, 1915, 5.6-h.p., 3 speeds, clutch, all accessories, Canelet sidecar, perfect condition throughout; genuine bargain, £55.—Rae, House Cottage, Twickenham. [6262]

1914 Indian Combination, 7.9-h.p., 2-speed, spring frame, electric model, fitted with 1915 kick start, in excellent condition; £55.—Elice and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492]

INDIAN, 1916, 7.9-h.p. Powerplus Model, Lucas lamps and horn, and special Canelet sporting sidecar, splendid condition; £95 cash, or plus 2% extra for deferred payments.—Wm. Whiteley, Ltd., Queen's Rd., W. [6250]

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—Indian, latest 1916 sporting Powerplus combination, Swan torpedo shape coach sidecar, disc wheel, T.T. bars, 3-speed, clutch, kick start, fully equipped, and as new, 85 gns.; 1915 7.9-h.p. T.T. Indian, 37 gns. [6288]

INDIAN, 1915, 5h.p. model, 3-speed, kick starter, lamps, and new Indian Canelet sidecar, £68/10; also 1915 T.T. 7.9-h.p. solo model, disc wheel, speedometer, lamps, and horn, condition quite as new; £55; closed for the holidays from Monday, August 6th, until Friday, 10th.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6301]

## Ivy.

IVY, 1915, 2-stroke, in fine order; £18/10.—The Walsall Garage, Walsall. [X3059]

IVY, 2-stroke, 2 1/2 h.p., 1915, good tyres, fully equipped, as new throughout; £25.—Advertiser, 156, Gt. Portland St., W.I. [5924]

## James.

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803]

JAMES Combination, 1915, 4 1/2 h.p., 3-speed, chain drive, lamps, horn, etc., very good condition; £50.—Wylie, Frating House, Grays. [X3527]

JAMES, 1917, brand new 3 1/2 h.p. twins, two only left; £69/10 cash, or deferred payments 2% extra.—Wm. Whiteley, Ltd., Queen's Rd., W. [6253]

1913 James, waterproof Bosch, chain drive, counter-shaft 2-speed gear, and coach sidecar, body brand new; £36/10.—Motor Exchange, Horton St., Halifax. [6122]

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—James, 1915, 3 1/2 h.p., 3-speed, sporting lightweight combination, 52 gns.; solo, 45 gns.; 1915 James, 4 1/2 h.p., 3-speed, 39 gns. [6289]

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—New 1917 models James in stock for immediate delivery; catalogues free: 2-stroke 2-speed, £40/10; 3 1/2 h.p. twin, 3-speed, £69/10; 4 1/2 h.p. big single, 3-speed, £69/10. [6282]

## The "GRADO" Paraffin Vaporiser.

Motor Cyclists! Here is a device which will enable you to run on paraffin and get results equal to petrol. It is designed by a practical engineer, and has been well tested. It fits between the engine and carburetter, and is connected to the silencer pipe by the clip illustrated. An injection of petrol through the tap on top starts your engine. Paraffin then does the work.



This is the New Model.

PATENT No. 13113.

It is just what you require to-day.

The price, all complete, is **35/-** Postage 6d. extra.

Delivery from stock. Order now, stating the outside size of inlet pipe.

## The "GRADO" MULTI-PULLEY.

PATENT No. 27485/13 and 6612/14.

Is simple in construction. Nothing to go wrong. Fits any standard belt-driven machine. Just half a turn of the handle changes from top gear to free engine. So simple. Starts you like a car.

The low gear gets you through traffic. The high gear saves fuel and gives you speed. The middle gears are there when you want them. The price, complete, for Triumphs, Bradbuys, etc., is **£3 3s.** Ball-thrust model, which we recommend, **£4.** Lightweight models from **£2 10s.** Recessed pulleys, 10/- extra. Postage 2/- extra. Delivery from stock. Write for Catalogue.



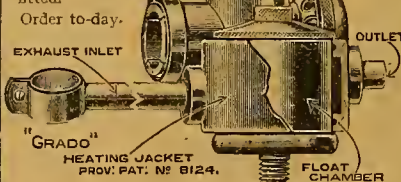
Pulley fitted to machine.

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## MOTOR CYCLES FOR SALE.

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J.E.S., 1hp., fitted to Raleigh 3-speed; 11 gns., motor complete, without bicycle, £8; condition excellent.—Rev. Brown, Chua, Selcyp. [X357]

## Levis.

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0880]

LEVIS, 2 1/2 h.p., 1916, 2-stroke, large P. and H. head lamp, generator, rear lamp, mechanical horn, Veeder cyclometer, condition as new throughout; £27.—Advertiser, 156, Gt. Portland St., W.I. [6202]

## Lincoln-Elk.

31 h.p. Lincoln-Elk, wicker sidecar, Hellesen ignition, splendid order; £12/10.—2, Taverners Rd., Peterborough. [X352]

## Mancunian.

MANCUNIAN, 2 1/2 h.p., 2-speed; £33.—W. and J. Motor Co., Ltd., 287, Deansgate, Manchester. [605]

## Martin.

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—Martin-Jap, 6h.p., o.h.v., 1915, new condition, 75 m.p.h. guaranteed; 37 gns. [6225]

## Matchless.

MATCHLESS Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0888]

LATE 1915 Matchless, 7.9-h.p. M.A.G. engine, 3-speed and sidecar, whole lot is in 1917 condition; offer—785, High Rd., Leytonstone. [634]

MATCHLESS 1915-16 8B 7hp. Combination, with lamp accessories, child's seat at rear, tip-top order; £25; closed for the holidays from Monday, August 6th, until Friday, 10th.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [630]

## Minerva.

31 h.p. Minerva and wicker sidecar, good condition B. and B. carburetter, Bosch mag., N.S.U. geo £20.—Riddick, High St., Malmesbury. [X355]

## Moto-Reve.

MOTO-REVE, 2 1/2 h.p., mag., spring forks, was tuning; £7.—Rand, Longcross, Surrey. [624]

## Motosacchoe.

1914 3 1/2 h.p. Twin Motosacchoe Combination, kick starter, electric lamps, luggage carrier, etc., driven 1,000 miles; £50; would sell separately.—Can be seen at 8, Bessborough Mews, Westminster, S.W. [635]

## New Hudson.

NEW Hudson, 1913, 3-speed; great bargain, £25.—The Walsall Garage, Walsall. [X301]

1915 New Hudson, 3-speed, clutch; bargain, £38.—Comer, 87, Carrow Rd., Thorpe. [X351]

NEW Hudson, 2 1/2 h.p., 3-speed lightweight, in nice condition; £19/19.—Motor Exchange, Horton St., Halifax. [611]

NEW Hudson 6h.p. Twin Combination, 3-speed, 1914 £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [601]

NEW Hudson 1913 Combination, 3 1/2-4h.p., free engine, 3-speed, clutch, good tyres; £28.—Rand, Longcross, Chertsey, Surrey. [621]

NEW Hudson Combination, twin, speedometer, lamp, new spare bolt, tube, splendid condition; £60; near—1, Thorncroft Rd., Brixton Hill. [635]

NEW Hudson, 2 1/2 h.p., 1915, 2-stroke, in very nice order; trial here willingly; very cheap at £25.—Simmonds, Commandant, Military Hospital, Epping, Essex. [X355]

## New Imperial.

NEW Imperial, 1917, 2 1/2 h.p., 3 1/2 h.p., 6h.p. model in stock.—Crow Bros., Guildford. [251]

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0888]

NEW Imperial, 1914, 2 1/2 h.p., 2 speeds, good order; £25.—S. G. Misselbrook, Edmunds Farm, Gomsha near Guildford. [X359]

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—New Imperial, 1916, 2-speed, as new; 1915 2-speed, 25 gns. [621]

NEW Imperial-Jap, immediate delivery all models. Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter and Tavistock Rd., Plymouth. [09]

NEW Imperial-Jap, 1915, 2 1/2 h.p., 2-speed, head lamp, generator, rear lamp, all accessories, good tyres, fully equipped; £25.—Advertiser, 156, Gt. Portland St., W. [59]

NEW Imperials, 1917 models, for immediate delivery No. 1 39 gns., No. 2 46 gns.; two new 1916 models No. 1 at £38.—Colmore Depots, 211, Deansgate, 31, Renshaw St., Liverpool. [088]

NEW Imperial-Jap, 2 1/2 h.p., 2-speed, variable ignition, Stewart speedometer, aluminium footboards, no lamps, good tyres, just re-namelled, and in perfect running order; £26, no offers.—Childs, High St., Peterfield. [62]



# THE MOTORCYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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## Industrial Alcohol.

**L**AST week, when referring to the fuel question, we touched very briefly upon the use of alcohol in internal combustion engines. On another page of the present issue will be found some notes on the same subject, culled from a most interesting treatise which deals with the production and use of alcohol for industrial purposes.

The whole subject is one of intense interest, because alcohol can undoubtedly be used as a motor fuel, and though, in its present form, it does not give the same results as petrol, it possesses these great advantages: that it can be produced at home, and consequently, in such times of stress as now obtain, when it is desirable to restrict imports as far as possible, it could, if available, allow everybody to motor without let or hindrance; that its production fosters industry of all kinds, benefiting the manufacturer and also the agriculturist. Alcohol is a fuel of which there is an unlimited supply, while it is an acknowledged fact that petrol is not inexhaustible, neither is benzole nor the coal from which it is produced. The fact that water can be added to the alcohol without stopping the engine is a most interesting one. It would not, of course, increase the thermal contents of the fuel, but it might very conceivably improve the consumption, because a certain amount of heat which under ordinary circumstances is useless, or even worse than useless—for we have to devise special means to get rid of it—would then be used in converting some, at least, of this water into steam, which would in its turn do useful work. Experiment has shown that the addition of water vapour to the mixture improved an engine for sidework by rendering the explosion less instantaneous. The sole deterrent to the manufacture of alcohol is that its sale is so hedged about with restrictions and taxes lest people should drink it that until these are removed it is useless to expect that any development in its production can take place.

## The Youngest Despatch Rider.

**T**HIS week we devote space to a question which, judging by the number of letters received, has created considerable interest. To those loyal youths who succeeded at such early ages in enlisting as despatch riders and so becoming important cogs in the wheels of our intricate war machine, we offer our congratulations. No doubt to them and to their parents there is pride in the mere fact of their serving, quite apart from the high motive that inspired them. But there is another feature about this eagerness and enthusiasm that is worthy of thought. Underlying the unquestionable patriotism there is the love of adventure and a love of the motor cycle, and, more likely than not, a zest for mechanics. We must therefore have among D.R.'s the very finest material from which to make air pilots. "Find them young" is the frequent cry, and surely, in view of the vastly growing Air Service demands, many embryo aviators could be culled from the great army of D.R.'s. It is not for us to say whether the supply of pilots is greater than the demand, and whether or not there are plenty of men ready for training, but it can truthfully be stated that there are potential pilots by the thousand among these young despatch riders, while many of the original riders are already serving in this capacity. Yet we know of many cases in which capable motor cyclists, after long service in France, have expressed their eagerness to obtain commissions, and, nothing else forthcoming, have accepted commissions in infantry units. This seems to us a misuse of good material, for in the motor cyclist is found the essence of what is required in the flying officer, and there ought to be no difficulty placed in the way of those whose ambition and training especially adapt them for this branch of the Army.

There is at present, however, as the majority of D.R.'s know, a good deal of red tape to unravel before a commission can be obtained in the air service.



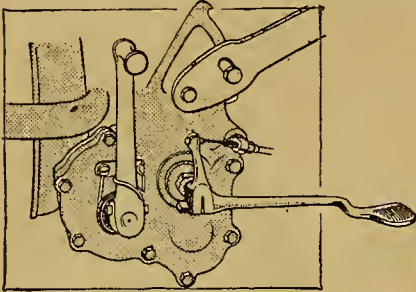
# IDEAS: Useful and Ingenious.

Gray Rees



## FOOT-CONTROLLED CLUTCH.

AN easy way of adapting a counter-shaft gear so that the clutch may be operated either by hand or foot is shown in the accompanying sketch. It will be seen that an arm is fitted

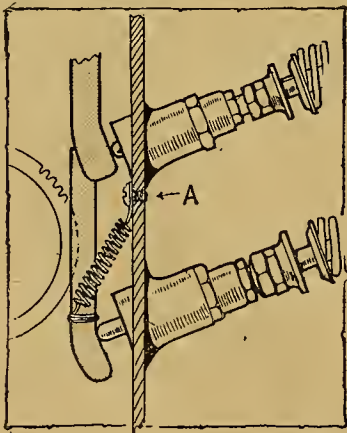


Foot-control, in addition to Bowden control, of a Sturmey-Archer clutch.

with a toggle, and by this means the clutch can be operated effectively with the heel, the Bowden control, of course, still being retained.—M.G. (M.T.), Rouen.

## VALVE CLATTER ON A DOUGLAS.

THIS somewhat objectionable complaint does not usually occur with the inlet valves, but it does with the exhaust in consequence of the extra clearance. I first tried springs placed under the tappets, but these did little good, as the noise still persisted through the ends of



Reducing valve clatter on a Douglas.

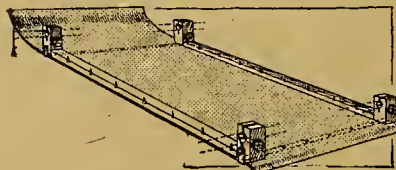
the rockers hitting the ends of the tappets inside the crank case. Finally, I hit upon this plan. Obtain from a Meccano stockist two spiral springs. These are just right for the job. Drill and tap a small hole in the side of the crank case,

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Rough sketches will suffice.

as at A. A small screw is fixed in here. One end of the spring is fixed to the exhaust valve rocker by two or three turns of strong copper wire, and, if desired, the wire can be sweated in place. The other end of the spring is fixed to the small screw—A. It is surprising what a difference this little alteration makes to the noise. On my machine there is now no noise at all from the valves.—G.F.J., Sheffield.

## AN EASILY-MADE UNDER-SCREEN.

AN underscreen is a very useful fitment, especially on a motor cycle which is used in all weathers, but, curiously enough, it is found as standard on very few makes. It is, however, generally easy to construct and fit one at home, and very few tools are required. A piece of sheet iron forms the principal part of the screen—what is known erroneously as tin is hardly stout enough, while brass or copper, though excellent, is expensive. Two pieces of wood are



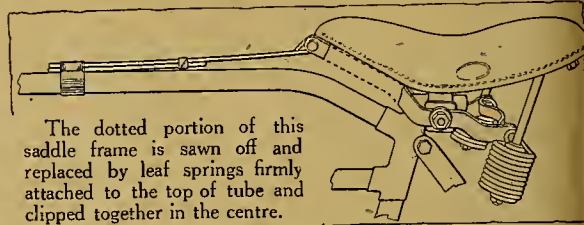
A simple home-made underscreen.

tightly screwed to the sides, not so much to add strength as to prevent rattle, and pieces of strip iron are riveted to the ends. The attachment blocks should be made of some hard wood which is not likely to split; ash or walnut will do admirably. First, a hole is bored through which the footboard support can be pushed (the tighter this fits the better). A saw-cut is then made longitudinally through this hole and some little distance beyond, and the blocks clipped in position by means of bolts and nuts. The bolt will often have to be below the crossbar, but the fitting will be

sufficiently secure. Lastly, the ends of the strip iron are screwed to the blocks and the job is complete.—AURIGA.

## SADDLE SPRINGING.

THE accompanying idea has been sent to us by a New Zealand reader, who says that he has seen it used on an Enfield, and that the leaf springs give a motion which can be equalled by only one spring frame machine which he has tried, namely, the A.B.C. The springs are 1½ in. in width and a little

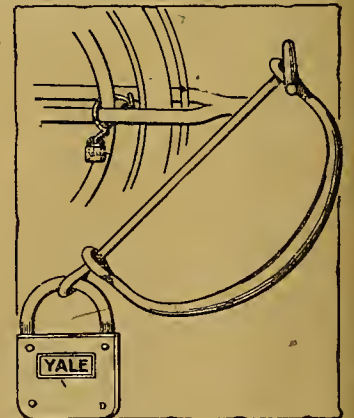


The dotted portion of this saddle frame is sawn off and replaced by leaf springs firmly attached to the top of tube and clipped together in the centre.

more than ¼ in. in thickness. The length of the springs depends upon the weight of the rider, and must be found by experiment. Our correspondent, R.E.H., assures us that the device is so satisfactory that it is well worth the trouble of careful fitting.

## A LOCK FOR MOTOR CYCLES.

THE best lock for a motor cycle I have come across is a brass kitbag fastener which is put round the bell rim and back stays. The padlock is a



An effective method of locking a motor cycle.

Yale, and can be procured at any ironmonger's for 5s. The fastener is procurable at officers' equipment depot, and costs 1s.—F.C., Carr. (Bootle).





## In Memoriam.

WE have all of us lost many old comrades of the road in this war, but no motor cyclist could be so widely missed and mourned as Ivan Hart-Davies—"H.D." as many of us affectionately called him. Fine rider as he was, we demand more than sporting ability in a pal, and Hart-Davies owed none of his many acquaintanceships to the fact that people love to hobnob with a celebrity. The simple fact is that he was one of the friendliest of men. His manner was the same towards everybody: and he was just as frank and good-natured to some chance stranger on the road who chanced to recognise him from press photographs, as he was to his usual companions. He made many friends, forgot none of them, and, to the best of my belief, lost none. He commenced speed work at an age when most men have lost the nerve for it: but in sustained speed he had no rival on the road. There were plenty who could hold him for an hour or two, and some who could temporarily outstride him: but nobody could keep going at a high speed as long as he, nobody could keep the same dash and restraint unimpaired after a long day or a long night in the saddle. He was game to the last. He had fretted over the probability that his age would keep him on home service flying; and he was as gleeful as a schoolboy on holiday when he was notified that work Overseas lay ahead of him.

## In Reply to "Wharfedale."

I WONDER much what "Wharfedale" is in civilian life: he does not seem to comprehend the uses of advertisement. Between the Scylla of over-boosting the flat twin, so that it risks being laughed off the earth by an infuriated public, and the Charybdis of leaving its merits to be appreciated by a few cognoscenti, he leaves me no middle path, and does not even see that my supreme egotism was one last appeal to his vaunted sense of humour. However, let us tackle more technical matters. His stern criticism of the flat twin is apparently based on A.S.C. workshop experience of a thousand machines. This being so, his technical condemnation is based on a single make. There was once a famous traitor who said that you knew what all Greeks were like, if you had met one: and there have been business firms who passed large contracts on the inspection of a single sample. But the traitor, if he were not fabulous, has been dust and ashes some thousands of years, and the firms filed their petitions before the war. So I will seek a parallel more germane. There was once a W.D. motor cycle which had a spring on its fork, and the aforesaid spring proved unequal to the demands of public service. Now large fleets of these machines passed through a base workshop, in charge of which was a highly efficient and extremely likeable engineer named Wensleydale. Mr. Wensleydale was an excellent engineer, but a poor logician, and, falling into an argument on fork springs, he delivered himself of

the verdict that all fork springs either were bad, or would not be much use for at least another ten years: whereby he tickled the groundlings mightily, but failed to convince the universe. Yet, gentlemen, there is something repellent about logic in these days—a taint of Prussianism, methinks. Let us seek light in a gentler sphere—what do the poets say? Was it not Tennyson who sang:

"'Tis better to have 'revved' and seized  
Than never to have 'revved' at all."

## The Four-cylinder Engine.

BEDELL'S ride on the Henderson has revived my interest in the possibilities of four cylinders. In many respects it resembles the flat twin from a practical standpoint. It offers perfect balance, a great range of speeds varying from furious r.p.m. down to the merest tick, and a very pleasant exhaust note: and these are the hall-mark of the flat twin. The four-cylinder is the more expensive to make, and the more difficult to provide with an adequate flywheel, seeing that its flywheel must revolve athwart the track, and so is not easy to construct for really slow running, whereas the F.T. flywheel runs in the line of the track, and may be of fair diameter. Again, a water-cooled flat twin would make a particularly uncouth engine: but a water-cooled *monobloc* four-cylinder would make a jovial little power unit for the post-war super-sidecar, and would lend itself admirably to the unit type of gear box and the shaft drive. The Henderson record undoubtedly means that it is possible to construct at a commercial price a four-cylinder machine free from the petty troubles and frequent adjustments which rendered the old fours undesirable mounts for the inexpert. If I were a manufacturer of sidecar outfits *de luxe*, I should certainly get out an experimental four-cylinder. Of all abominations the big V twin is the worst, to my thinking, though it has been, and still is, an uncommonly useful makeshift. It blocks up the entire frame, and is inaccessible. We have got to advance beyond it, and that soon, and for high powers and sidecars the four-cylinder might well be its worthiest successor.

## Another Great Ride.

IF anybody had told me that mortal man would ever ride round the clock on a motor bicycle at an average speed of nearly fifty-eight miles an hour, including all stops, I should have scoffed at him: and if my opinion of things American had not been transformed by their unexpected pugnacity towards Fritz, I do not know that I could quite believe it now. "Cannonball" Baker's ride was some stunt so far as the Indian machine is concerned, but the mechanical aspects pale by comparison with the tough tenacity of the rider. I begin to think we shall see some spring frames out in the next T.T. ["Cannonball" Baker's record has been eclipsed, as reported in this issue.—ED.]



# DARTMOOR AS A TOURING GROUND.

SOME ACCOUNT OF THE  
ROADS, BEAUTIES, AND  
ANTIQUITIES OF SOUTH DEVON.

By H. TAPLEY-SOPER.

THE "Forest of Dartmoor," as it is described in ancient documents, generally calls up visions of impossible roads, bogs, fogs, escaping convicts, and, perhaps to the more romantic, "pixies" (the local name for the little fairies who are supposed to dwell in parts of the moor). For the fairies we cannot vouch, fogs seldom occur in the summer months, and bogs need not trouble motorists who are content to stick to the main roads, which generally have good surfaces, and pass through some of the most majestic scenery to be found in England.

Escaped convicts are almost entirely confined (no pun intended) to the fertile imagination of novelists. We can only recall two successful attempts during the past fifteen years, and in each case liberty only extended over a few hours. Such attempts are invariably made in autumn when fogs, which are not of the black variety known to Londoners, but a whitish, rolling mist, suddenly spring up and envelop patches of a few miles in circumference, and which can be easily escaped by the exercise of caution and commonsense. Moreover, the authorities, apparently anticipating the wishes of, at any rate, lady motor cyclists, have recently removed all the convicts from Dartmoor and given up their quarters to that curious hybrid, the conscientious objector.

Any guide book will inform those interested of the numerous objects of antiquity which the moor possesses—the stone avenues, sacred circles, cairns, kistvaens, cromlechs, logan stones, and rock basins—many of which to this day remain as something of a mystery to the antiquary and historian.

Roughly speaking, "Dartmoor," as it is pronounced by the old moor-men, is about twenty miles square, and, except in the wooded and inhabited bottoms, consists of a huge igneous upheaval of granite, covered only by a thin mantle of peaty moss. Its general appearance has been aptly described by an American tourist as "bosomy." In some places bare rocks rise to great heights. These are known as tors, the highest being High Willhays, which is 2,039 feet above sea-level. Heather and ling flourish here, and large patches of glorious golden furze or gorse brighten the moors during the summer months and add to its fascinating colour effects.

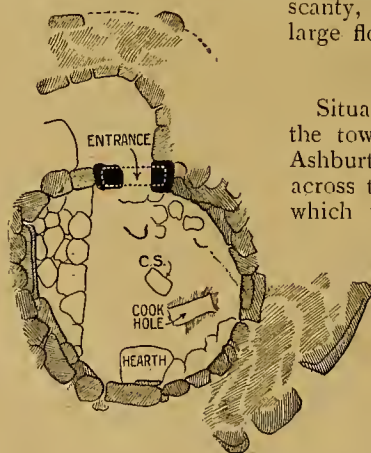
The author and his friend, with the A.J.S. combination, on which the tour was accomplished.



We learn from "Domesday" that in the time of Edward the Confessor Dartmoor was of the King's *demesne*. Its description as a "forest" is a mediæval euphuism. The extensive tracts of land in different parts of the country called Royal forests were appropriated for preserving animals of the chase, but they were not necessarily covered with wood in all parts, but just had sufficient in places to afford shelter and cover. Since 1337 the Forest of Dartmoor and its belongings have been permanently annexed to the Duchy of Cornwall as an appanage of the Prince of Wales. Doubtless our readers have recently seen accounts of the proposed attempts which have been made by the Duchy authorities to reclaim certain tracts of land for agricultural and cattle rearing purposes. Excepting hares, rabbits, and a few foxes, there is now nothing on Dartmoor to hunt, but the many streams which feed the county's principal rivers provide good fishing and wild fowl. The small and hardy Dartmoor pony which breeds here in a semi-wild state is well known, and the pasturage, although scanty, sustains during the summer months fairly large flocks of sheep.

## The Dartmoor Roads.

Situated on the outer circle of the moor are the towns of Okehampton, Moretonhampstead, Ashburton, and Tavistock. These are connected across the moor by well engineered main roads, which it is the purpose of these articles to introduce in detail to motor cyclists who, when visiting Devon, often miss her most unique features under the impression that Dartmoor roads are mere cattle tracks and precipitous hills. The writer has on many occasions been over all the routes described with a sidecar and passenger on a  $3\frac{1}{2}$  h.p. Lea-Francis, a 4 h.p. A.J.S., and a 6 h.p. A.J.S. The latter, with standard sidecar, is his present outfit. His riding weight, to use a turf expression, is 13 st. 6 lb.



A plan of one of the many Dartmoor hut circles. Several early writers wrongly connected these curious ruins with the Druids



**Dartmoor as a Touring Ground.—**

and his usual passenger, who has supplied the photographs for these articles, turns the scale at a little over 12 st. The outfit, with spare wheel and other paraphernalia, weighs  $5\frac{1}{2}$  cwt.

Having done 5,000 miles with this combination with only two punctures the spare wheel is now carried as a charm against punctures rather than as a substitute for such calamities. It must not be supposed from these remarks, however, that motor cycling on Dartmoor is quite such a simple matter as bowling along through the New Forest; there are some severe gradients and some tricky curves to negotiate, but these will not call for more than ordinary care and skill from experienced drivers mounted on reliable machines. Off the main roads there are some real terrors, but the routes now described are suitable for the motor cyclist with his wife—or somebody's sister—in the sidecar.

Leaving Exeter, which is an admirable centre for all parts of Devon, you proceed down Fore Street, which is steep, narrow, and "trammy," and with due caution shoot across Exe Bridge and up a short nap called Dunsford Hill, and having descended on the other side—as you will mount and descend many such hills during the day's journey—you select by the aid of a signpost

wide curve on a steep gradient, which should be treated with respect and taken on second gear. The church is on the right just past some picturesque early seventeenth century almshouses which will be noticed at the top of the hill. Until a few years ago there stood in the centre of the town at the cross roads a large tree known as the "dancing tree." It was kept cut so that its branches stretched out level and supported a platform upon which, on festive occasions, dancing took place. In 1807 a band composed of French prisoners of war from Princetown gave a concert on the dancing tree. In the churchyard can be seen the tombstones of some of these prisoners who died here while on parole.



The river Teign in draught—a picturesque scene near Steps Bridge, Dunsford.



Blackingstone Rock, Moretonhampstead, 1,127 feet above sea-level.

on your right the Moretonhampstead Road. The whole of this road is somewhat restricted and twisty, and should be taken at a moderate speed, which will allow of due admiration of the beautifully wooded surrounding country.

About seven miles out, at a picturesque point, the river Teign is crossed by Steps Bridge. This is a favourite short run from Exeter for an open air tea and a scramble along the banks of the river which offers much of interest, whilst in the village of Dunsford near by is an old church, the tower of which can be seen from the bridge.

Moreton, to use its usually abbreviated form, is about six miles further on, and is approached by a

At Moreton in 1806 George Bidder, the rapid calculator and well-known engineer, was born. His reputation was so great that on one occasion when engaged to give evidence in a law suit the opposing counsel asked that Bidder should not be allowed to remain in the Court, on the ground that "nature has endowed him with qualities that do not place his opponents on a fair footing." The Moreton people claim that Bidder's intellect was due to the clear air and invigorating breezes which this old moorland town enjoys, showing that in those days the exhilarating effect of high altitude was recognised.

**Blackingstone Rock.**

About three miles from Moreton is a well-known Dartmoor tor—Blackingstone Rock—from the summit of which (1,127 feet above sea-level) a most magnificent view is obtained. Steps have been cut in the rock and a rail provided for those who care to venture to the summit, where a cool and refreshing breeze can be enjoyed on the hottest summer day. Another pleasant after-lunch ramble, which must be taken on foot, is to Mardon Down, which is about a mile from Moreton. Proceeding by way of the road on the north side of the church take the left-hand branch at the fork. About a quarter of a mile on the right soon after



### Dartmoor as a Touring Ground.—

reaching the down are the remains of a cairn known as the Giant's Grave; a local tradition says:

"Here beneath this great tall stone  
Great Maxi Magur lies,  
And if you goes at twelve of night  
You'll hear most awful cries."

Tor is the name given to the imposing masses of granite which surmount many of the hills, and which are amongst the most striking features of the scenery of Dartmoor. The word is said to be derived from the Celtic "twr"—a tower, which appeals as highly probable, as from below one gazes up at these lonely and stately formations and recalls what the geologists tell us of their former lava state from which they were uplifted by the forces of nature to solidify and remain in solid grandeur as sentinels of the moor. Blackingstone Tor is the finest in the Moreton district, but the western and eastern sides of the moor provide grander and more numerous specimens. Their summits are visible for miles before the moor is actually reached, and the motorist bound for a trip across this district should note them as he approaches. Each tor has a name, as Fur Tor, Mis Tor, Yes Tor, Saddle Back Tor, Hey Tor, etc., and each possesses distinctive features or contours which after a while can be easily distinguished from a considerable distance. The mists which often surround the summits of the tors in the early morning and late evening add greatly to the colour interest and provide most gorgeous and sometimes weird sunrise and sunset effects.

### Grimspound.

The Blackingstone Rock and Mardon Down excursions are off the main road, and are introduced for those who do not care to follow us on to Tavistock, the farthest point aimed at along this route. Another deviation would be to Grimspound, the most notable of the Dartmoor hut circles. After passing through Moreton, take the sixth turning on the left. A mile and a half along this road will bring you to a bend

on the left, where you must dismount for a scramble up over a rugged escarpment, down which runs a little stream of water—the stream which supplied the inhabitants of this prehistoric encampment which we have come to view. The actual circle is about a quarter of a mile from the spot which we have indicated. Most of the stones with which it was built still remain, but only a small proportion are now *in situ*. They originally formed two irregular circles, one within the other and about three feet apart, and are estimated to have risen to about five feet; they enclosed about four acres. The antiquaries are of the opinion that, whatever was the original purpose of its builders,

the place was never finished, and was merely used as a temporary summer camp and cattle pound by the inhabitants of the valleys, who drove their cattle up for summer feeding. The contention of the earlier writers that Grimspound was connected with Druids, or was a fortified village, is now generally discredited. The surrounding walls served the purpose of a cattle pen and a protection against wild animals. Within the pound are twenty-four hut circles. One, enclosed within a railing, has been partly restored to show visitors what form these early habitations took. The raised dais, it is presumed, formed a seat by day and the owner's bed by night. The walls of these huts were four or five feet high, and are said to have supported a roof probably composed of turf, rushes, or heather.

Some flint implements have been found in these enclosures, also pot-boilers or cooking stones, and cooking holes containing charcoal, which prove that the huts were inhabited at a very early date. Many of the slabs of stone used in the walls are quite large, and one particularly hefty fellow is estimated to weigh nearly four tons. From the fact that no evidence is forthcoming that the people who used Grimspound were acquainted with metals or pottery, it is concluded that they belonged to the early Neolithic Age, which, according to geological time, was the period somewhere about 1500 years B.C., but in this antiquarians differ in opinion.



(Top) Curious seventeenth century almshouses at Moretonhampstead.  
(Bottom) Two Bridges, near Tavistock. It is this district that Eden Phillpotts takes as the scene of several of his famous novels.



## Dartmoor as a Touring Ground.—

**An Ancient Custom.**

Retracing our tracks to the main road, we turn left and proceed along the Princetown and Tavistock road through miles of typical moorland scenery. At about three miles we can pass one of the moor's isolated hostelries—the Warrenhouse Inn. The previous night, if the tourist tarried at Exeter, he may have recalled Gray's elegy when at eight o'clock he heard the Cathedral bell tolling.

"The curfew tolls the knell of parting day."

At this inn still lingers the custom of covering the fire on retiring to rest, very much in the manner said to have been ordered by William the Conqueror. The fireplaces in all the old Dartmoor buildings are of the solid and spacious variety, in which the fuel, which comprises logs or lumps of peat "vegs," as they are called, is burnt on an open hearth. When mine host of the Warrenhouse Inn retires to rest he rakes the hot embers together and protects them with a "covrefeu" or a fire cover. In this way the fire is kept burning or smouldering during the night, and requires only to be stirred and fed in the morning; fires have in this way been kept continuously burning for years.

From the Warrenhouse to Two Bridges is seven miles, a stretch of safe road for those who wish to indulge in a speed burst. Two Bridges can be seen in the valley as you speed down the hill; on nearing it the road from Ashburton debouches on the left. Here the driver should get his mount well in hand to negotiate the steepish left-hand curve, upon which other traffic is usually encountered—often on the wrong side. The Two Bridges Hotel is perhaps the best known of all the moorland houses. It is a favourite resort of anglers and tourists. It has a very comfortable lounge which always reminds one of a ship's-saloon. If a ramble in this district is sought, enquiries should be made for Wistman's Woods, one of the freaks of the moor, or for Crockern Tor—one

of the moor's historic spots. On this tor, in the early days, the Parliaments of the Stannary Towns met. We shall have more to say about this unique legislative body when we are on the tour which passes through Ashburton.

**Tavistock.**

On passing over the bridge opposite the hotel a choice of roads is presented—the direct one goes to Princetown, the right-hand swerves to Tavistock. Princetown will be our objective on another tour and from a different direction; to-day we are labelled Tavistock, which is nine miles further on along a stretch of main road.

As Tavistock is approached Kelly College is passed on the right, and further on is the famous Drake statue by Boehm, a replica of the one on Plymouth Hoe. The Great Elizabethan Navigator was born at Crowndale, near Tavistock, in 1542. The town of nearly 5,000 inhabitants is pleasantly situated, and provides a good centre from which to tour this part of the county. It is fifteen miles from Plymouth and thirty-four from Exeter. The remains of the Benedictine abbey, founded by Ordulph in 966, are its principal antiquarian feature. The former magnificence of this abbey can be judged from portions which still exist, parts of which are embodied in the Bedford Hotel and the surrounding buildings. It was at Tavistock Abbey that the fifth printing press to be set up in England was established in 1525.

The church, which dates from 1318, is a large and interesting one; in it is a glass case containing what is said to be the thigh bone of Ordulph, the founder of the abbey, who was a man of great stature. The town has produced many famous men, including William Brown, the author of "Britannia's Pastorals," and the famous lawyer, Sir John Maynard, who was born in 1602 and lived to a great age. When he was presented to William of Orange, at the age of eighty-seven, the King remarked that he must have outlived all the judges and eminent men of his day.

"Yes," replied Maynard, "and I should have outlived the laws too, had it not been for the happy arrival of your Majesty."

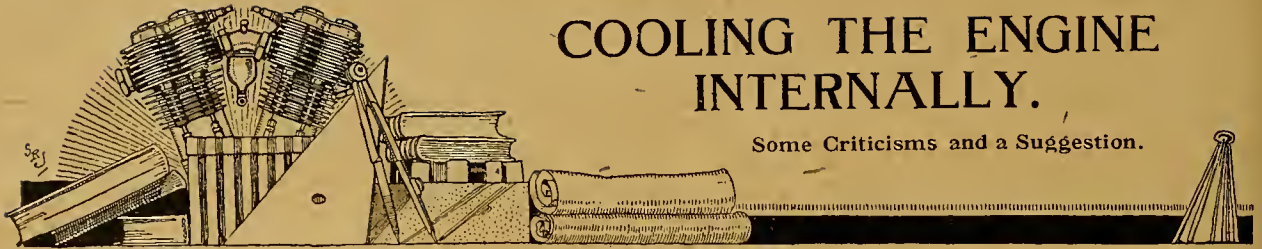
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[The above article is the first of a series in which we hope to describe various parts of England and refer to interesting places and objects which are not all to be found on the main roads. It will be followed by further descriptions of Dartmoor by Mr. H. Tapley-Soper, and later we propose to visit other districts. Although at the present time touring by motor cycle is out of the question, we feel that, while motor cyclists exist, the spirit of the open road will never be extinguished, and if we are able to suggest trips which can be taken in happier days our object will be accomplished.—ED.]

**HELPFUL BUT RISKY.**

Pillion riding is child's play compared with the above dangerous practice of giving a helping hand. No doubt the action was appreciated but the danger is real.



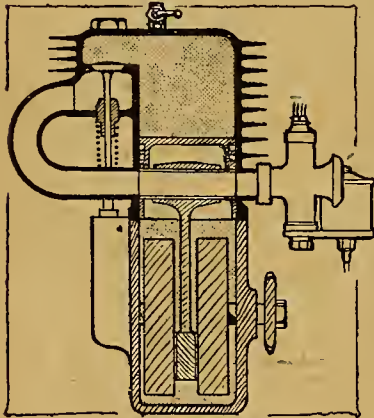


## COOLING THE ENGINE INTERNALLY.

Some Criticisms and a Suggestion.

**T**HIS subject appears to have been rather hastily thought out. The first great objection which does not seem to have been foreseen by the writer of the article published in the July 19th issue is that in the four-stroke engine during the compression stroke the ascending piston will draw a full charge into the crank case, and at the same time by lowering pressure in the neighbourhood of the jet cause petrol to overflow. On the down stroke immediately following, the air drawn into the crank case will be discharged, together with any oil, petrol, etc., that may be caught up. Another objection is the great amount of resistance brought into the induction pipe, if the air is properly filtered of grit, etc.

Regarding oil fog, there is this remark: "A certain amount of oil fog would be drawn into the engine which is not without its use." In view of the experience of two-stroke users, it is to be feared that an excess of oil would be drawn into the engine, thus introducing one of the minor evils of the two-stroke into the four-stroke engine.



A contributor's suggestion for cooling an engine internally.

Again, it must not be forgotten that in making the piston into a pump with the crank case as receiver extra work is being put on to the engine at at least three strokes out of four.

With regard to the troubles which the suggested arrangement is expected to reduce, these are clearly stated at the commencement of the article.

### The Conservation of Heat.

Now the crank case is the coolest part of the engine. Further, the amount of heat which can be taken from the crank case, little as it is, will be transferred to the cylinder. This itself is not necessarily an evil, for as it is a heat engine which is under consideration, the more heat which can be conserved the more efficient will be the engine—all this provided that the very conservation of heat does not raise insurmountable difficulties in the mechanical working of the engine, e.g., excess temperature in neighbourhood of piston, consequent bad lubrication, etc. The great fact remains, however, that the evil of excess of heat is felt in the cylinder and piston; it therefore would seem on the present showing that the proposed

arrangement will have little effect in diminishing this. If it were possible to reduce the heat at this point to a working maximum and at the same time conserve the heat which is conducted away a saving in petrol would be effected; or, to put it more correctly, the engine would be more efficient and flexible.

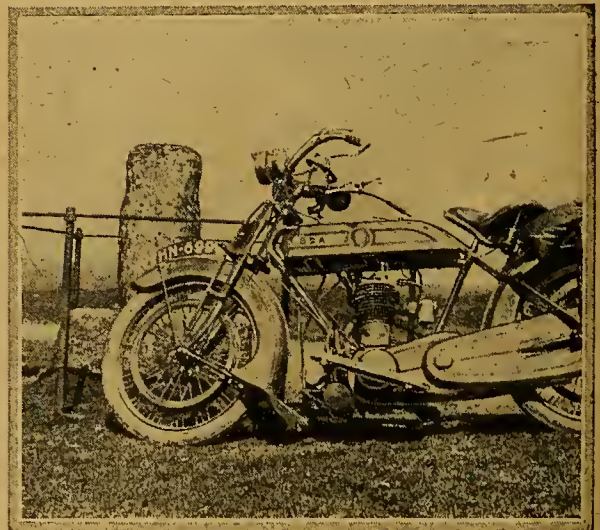
### Air through the Gudgeon Pin.

As destructive criticism is not very encouraging to progress, I enclose a sketch showing a method of "internal cooling" which, I think, has its attractions. This was the outcome of reading the article by "G.S."

The suggestion is, as will be seen from the sketch, to have a hollow gudgeon pin and draw the air through this. There are two positions in which the carburetter may be placed: (1.) Carburetting before passing air through the gudgeon pin. (2.) Carburetting after passing air through the gudgeon pin. The first is a no-trouble position; the second introduces slight complications.

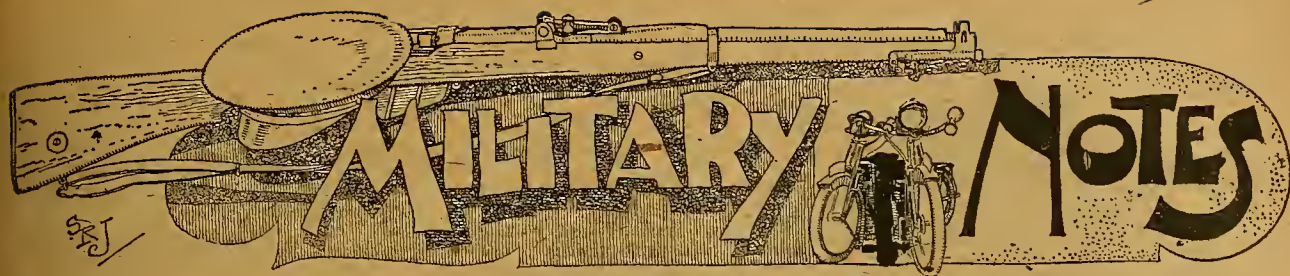
The induction stroke would be rather different from ordinarily owing to the fact that there would be no movement of mixture into the cylinder until the hollow gudgeon pin registered with the ports in the cylinder walls. Carburation would be improved by this method, although it is by no means certain that as great a volume of gas would get into the cylinder at high speeds.

ENGRO.



**RERE CROSS (WESTMORLAND).** Situated on the highest range of this tableland, about seven miles from Brough, Westmorland, is the Rere or Roi Cross, as it is commonly called. It was here, after centuries of bitter warfare, that the kings of England and Scotland met to decide the boundary of the two kingdoms, and so raised this, the "Cross of Kings," on which were engraved the images of the two monarchs. The motor cycle is a B.S.A.





## THE YOUNGEST D.R.

Since publishing the letter from Mr. Roughley, in which he questioned whether his son was the youngest D.R. serving abroad, many photographs and letters have reached us from young D.R.'s who aspire to that honour. The following are a few received on this subject, and are interesting as showing the enthusiasm and loyalty of these young motor cyclists, who enlisted voluntarily to serve their country at the very beginning of hostilities.

### IN THE SECOND BATTLE OF YPRES.

"WITH reference to the query which appeared in your valued paper regarding the youngest D.R., I beg to submit the name of a D.R. who, I think, will stand a good chance for the honours. He is Cpl. Speedie, and was attached with many more of us for duty with the advanced headquarters of the corps during the second battle of Ypres in April and May, of 1915. During the engagement he was sent down to the base, not on account of his lack of pluck, but on account of his age, which was only slightly over 16.

"He was previously attached to the army headquarters, and any of the old D.R.'s will remember him as being a plucky chap.

"I would just like to add that your paper is still full of information, and interest for any of the old M.C. brigade, and was eagerly sought after while we were in France.

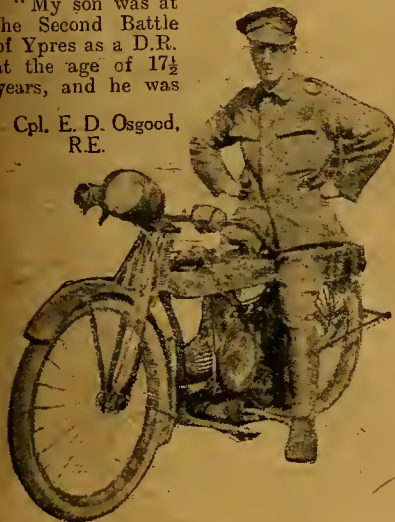
"R. S. COLLINS, LT., R.F.C."

### AT YPRES AT 17½ YEARS.

"ALL honour to our gallant young Englishmen of the type of W. Roughley, spoken of in your issue of July 19th. Still, his record of age is easily beaten by my boy, E. D. Osgood, R.E., and I expect by many others.

"My son was at the Second Battle of Ypres as a D.R. at the age of 17½ years, and he was

Cpl. E. D. Osgood, R.E.



one of the very few who were fortunate enough to get round 'Hell's Corner' on that terrible night, and they all deserve the very best we can think of them.

"EDWIN OSGOOD."

### FOREIGN SERVICE AT 14 YEARS 11 MONTHS.

"REFERRING to the paragraph on page 65 of a recent issue of *The Motor Cycle*, I am afraid Mr. Roughley's son cannot claim to be the youngest despatch rider on service.



F. J. Hollis, D.R.

In this connection I may mention that my son enlisted in December, 1914, a fortnight before his fifteenth birthday. He sailed for India within a week of his enlistment, and spent his birthday at sea, somewhere near the Suez Canal. After two years' service in India he left for active service in Mesopotamia in December, 1916. Since then he has been acting as despatch rider attached to a Signal Squadron, and is now 17 years 7 months old.

Mr. Roughley, however, can be proud of the fact that his son is one of that gallant band of lads who rushed to arms when their country needed them without waiting to be fetched, or filling the air with their shrieks about 'indispensability' or 'conscience.'

"B. W. HOLLIS."

### DESPATCH CARRYING IN FRANCE AT 15 YEARS 8 MONTHS.

"WITH reference to Mr. Roughley's question in *The Motor Cycle* of July 19th, 1917, as to who is the youngest D.R. in France, I should like to mention the name of K. O. Bathgate of the R.F.C., who is riding with me. He came to France in November, 1915, at the age of 15 years 8 months, and has been carrying despatches from that date until the present day.

"W.H.W., R.F.C."

### ON ACTIVE SERVICE 2 YEARS 7 MONTHS.

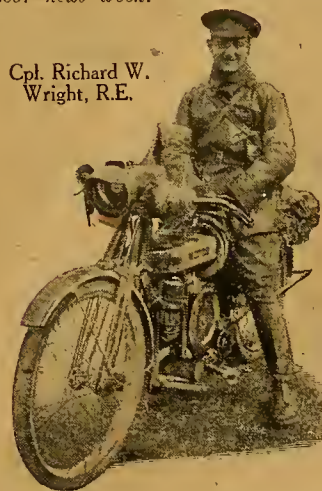
"MR. ROUGHLEY'S query as to the youngest despatch rider should bring forward some interesting information respecting ages at which our boys voluntarily accepted service for their King and country.

"I would mention that my son, Cpl. Richard W. Wright, R.E., enlisted in November, 1914. He went to France on New Year's Day, 1915, at the age of 17½ years. He is still a D.R. in the section to which he was originally allotted on going to the Front, and it will therefore be observed that he has two years and seven months active service to his credit.

"RICHARD J. WRIGHT."

A further selection of letters and photographs from young D.R.'s will appear next week.

Cpl. Richard W. Wright, R.E.







A Douglas motor cycle, an old sack, and a few boxes have been utilised by the ever adaptable D.R., to provide shelter from the terrific heat of the Mesopotamian sun. The scene is between Bagdad and Samarra.

#### SERVICES RECOGNISED.

**A**MONGST the names of those brought to the notice of the Secretary of State for War, for valuable services rendered in connection with the war, is that of Capt. A. J. Palmer, H.B., M.G.C., who joined the ranks of the No. 5 Battery of the M.M.G.S. in the early days of the war, previous to which he was assistant cashier to *The Motor Cycle*.

#### MOTOR CYCLISTS IN THE R.F.C.

**A**RACING motor cyclist, Mr. F. J. Pigot Disney, a member of the B.M.C.R.C., Surrey M.C.C., and other clubs, together with Mr. Baldwin, the Matchless rider, have joined the R.F.C., and are training as pilots. Disney has received his commission, while our informant, Sec.-Lt. Vernon Gayford, R.F.C., who is well known in Surrey motor cycling circles, has also received his commission in the famous corps.

#### AN ALL-ROUND SPORTSMAN.

**T**HE late Lt. Ivan B. Hart-Davies, whose obituary we published in the issue of August 2nd, we have shown to be an excellent all-round sportsman. However, it was not mentioned that among his various accomplishments he was an expert on the bob-sleigh, and in 1913, with three other motor cyclists who had never indulged in this sport before, he won the Murren Cup. It is also interesting to relate that he took to flying before the war, as an amateur.

#### HELP OF THE TANKS.

**I**N the recent big attack in Flanders the Tanks again played a great part in capturing the pestiferous nests of machine guns. Philip Gibbs says: "Many Tanks have gone forward with our infantry, sometimes in advance and sometimes behind, according to the plan of action mapped out for them, and have done better than well against several of the enemy's strong points, where, for a time, our men were held up by machine gun fire."

Mr. W. Beach Thomas also speaks of their great help: "The general progress of the battle was of this nature: The northern half of the attack was a little

earlier than the southern. Our men and some of the splendid French troops alongside them went over the parapet just before 4 a.m. In threequarters of an hour we had advanced 1,000 yards to the first halting place, in spite of the necessity of building and crossing bridges under fire. Soon after five o'clock we and the French started on a further adventure, and again every unit swiftly reached its mark. There was hard fighting at three places, but all were won, one of them by three Tanks."

The *Motin's* correspondent states that the Tanks covered themselves with glory. One of them attacked a concrete redoubt, every man in which surrendered, while in another a Tank made for a spinney bristling with machine guns, and so crushing was the effect of the Tank's advance that there was scarcely a stick left standing, and the entire garrison surrendered.

#### ARMY AND NAVY PAY.

**R**ECENTLY sixty or so Members of Parliament met at the House of Commons to consider the question of sailors' and soldiers' pay. Mr. O'Grady said that where British battalions were brigaded alongside Colonial troops, the Britisher could only deplore the disparity which gave him one-sixth the pay received by the Australian and New Zealander.

The Management Committee suggested that the minimum net allowance to any British soldier should be 3s. a day, and that the Government provide and pay all allotments to wives and dependants.

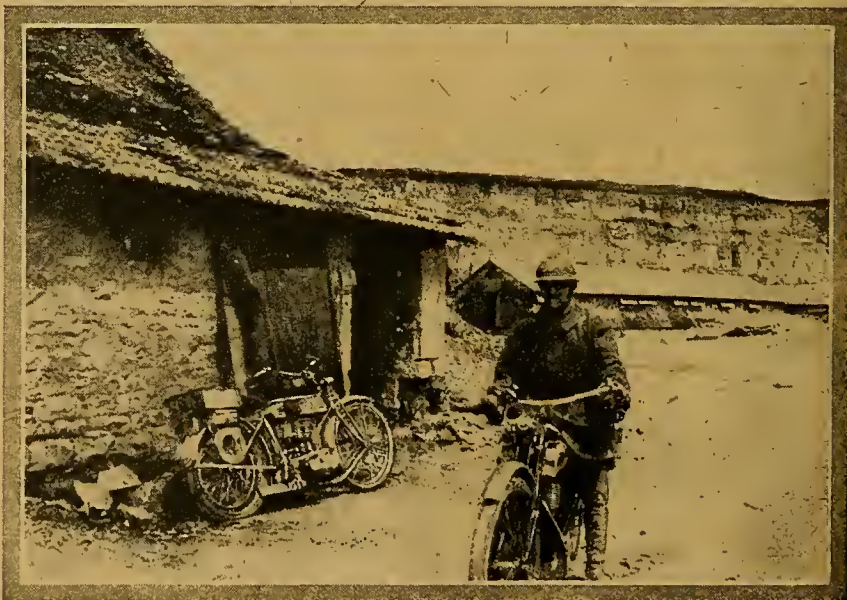
Lieut.-Col. Wilson, M.P., advocated equalising the pay of sailors and soldiers, and said it was a scandal that men nearest the trenches got the worst pay of all. Infantry men were the worst, then in order came the Artillery man, A.S.C., Ordnance Corps, and the Labour Battalion, until they got to the War Office, where they got the best pay of all.

#### MOTOR CYCLE TENNIS CHAMPION KILLED.

**S**GT. J. E. H. ZIMMERMANN, of Bromley, the International tennis player—whose death at a German field hospital, after being reported missing, is notified—like many other tennis players, owned and used a motor cycle. He joined the H.A.C. last year as a private, and was a member of a big chemical firm.

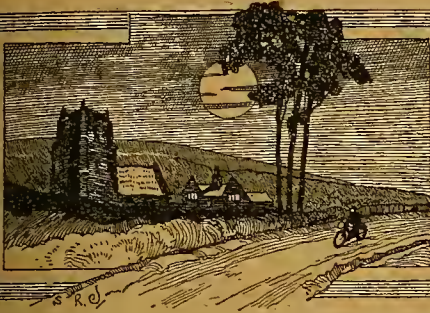
#### A GALLANT MOTOR CYCLIST.

**T**HE death is announced on the battlefield of Sec.-Lt. Neville Ernest Baker, who was killed on July 31st. He was educated at Clifton College and Trinity College, Oxford, where he joined the 'Varsity O.T.C., and on the outbreak of war became a motor cyclist despatch rider with the rank of corporal, R.E. Signal Service. He went to France with the original Expeditionary Force, served as a corporal through the campaign, including the retreat from Mons and the battles of the Marne and Aisne. In January, 1915, he was given a commission as Temporary Second-Lieutenant, R.E. Signals, and, after receiving further training in England, he again went to the Front in November, 1915, as Brigade Signal Officer. He was recently appointed to the Tank Corps as Signalling Officer, and was killed by a shell while inspecting a wireless installation he had erected. He was a most efficient officer, and was spoken of very highly by his C.O.



A French despatch rider emerging from "Poste de Commandement" of the hidden artillery in a stone or gypsum quarry. (Passed by the Ministère de la Guerre, Paris.)





## INDUSTRIAL ALCOHOL.

Useful Notes concerning a Fuel which can be Produced in almost Unlimited Quantities.

ALL who are interested in the fuel question—and what motor cyclist is not?—should read “Industrial Alcohol,” by Robert N. Tweedy, published by the Co-operative Reference Library, Plunkett House, Dublin. This is an informative book of eighty-eight pages, dealing with the question of industrial alcohol in a most thorough and efficient manner. The reading of the treatise is extremely interesting in view of the leading article appearing in the last issue of *The Motor Cycle* on the subject of alternative fuels to petrol. This article states that “alcohol produced from potatoes is spoken of as a probable solution (of the petrol-difficulty), but obviously the product, if procurable—which, of course, it is not—would be liable to taxation.” Thus the case for alcohol is quite impracticable at the present time, even if it were produced in quantities, on account of the obstructive legislation.

### German Forethought.

The book goes on to point out that Germany saw the possibility of alcohol being used without vexatious restrictions in the arts, crafts, and sciences. In 1891 she freed industrial alcohol entirely, with the result that in 1904 the German industries consumed 73¾ million gallons of non-potable alcohol manufactured from the products of her own soil.

An interesting feature about the treatise is that the question of fuel in motor vehicles is dealt with pretty extensively. The distillation of alcohol from potatoes seems to be a great success in the land of our enemy, a vast quantity being used for lighting, heating, and cooking, while the number of agricultural and other engines built specially to use alcohol has grown very rapidly. There are now many thousands at work.

“The most striking evidence of the importance of the native supply of liquid fuel,” says the author, “is given in a paper read by Professor Vivian B. Lewis in February, 1915, in which he says that when the Russians had over-run Galicia, and shortage of petrol seemed likely to paralyse the German transport service, every motor car in the empire was adapted to run on alcohol.”

### A Suitable Mixture.

Speaking of its suitability for internal combustion engines, Mr. Tweedy demonstrates that it has many points of superiority to petrol, but it suffers from the serious defect of not sending off vapour readily enough to start an engine without the application of heat; this is, however, overcome by mixing it with benzole. When used in a petrol engine it cannot develop its full power, and that is one of the difficulties to be faced, as a long time must elapse between the introduction of alcohol for general use and the superseding

of the petrol engine by an engine designed for the use of alcohol. Petrol and alcohol do not mix, but benzole and alcohol dissolve readily in each other in any proportions, and the Germans made their petrol substitute with a mixture of which 80% was alcohol (95% strength) and 20% benzole, with a little naphthalene dissolved in the latter to give it greater heating power. This mixture, entirely home produced, gives five-sixths the power of petrol in a petrol engine.

In our opinion, at any rate, there is no reason why the same ingredients could not equally well be produced in England. The writer goes on to say, “This difficulty of starting is one which is sure to be overcome when a sufficient number of people are interested in the matter, and it is quite likely that several solutions will be disclosed after the war. For instance, acetylene is soluble in benzole and in alcohol, and that may have special value in the experimental work which will have to be carried out when opportunity permits.

### Fuel and Water.

Mr. Tweedy tells us some interesting facts concerning alcohol. Water mixes perfectly with it, and thus renders it the safest of the lighter liquid fuels. A petrol fire is difficult to extinguish because the flaming oil floats and spreads on the water which is poured over it. Flaming alcohol, however, mixes immediately with the water, and the fire is subdued directly the mixture has become diluted to such an extent that combustion cannot continue. For the same reason, a few drops of water in a carburettor in which petrol is used will cause an involuntary stop, whereas the only question with alcohol is whether higher economy is to be obtained from the engine by the addition of water.



M.G.C. (MOTORS) IN TRAINING. Roadside tyre repairs to a Vickers-Clyno machine gun outfit.





## TIME TO LIGHT LAMPS

SUMMER TIME.

Aug. 16th	...	8.50 p.m.
" 18th	...	8.47 "
" 20th	...	8.43 "
" 22nd	...	8.39 "

### Kent Coast Road Closed.

Motor cyclists should note that the popular and direct coast road from Ramsgate to Sandwich, via Pegwell Bay, is now closed to the public. The alternate road necessitates a long inland detour. On the coast road from Deal and Dover to Folkestone there are other restrictions. Motor cyclists should stop when challenged, and no camera may be carried.

### Bradbury Balance Sheet.

In submitting their statement of account for the year ended June 30th, 1917, the directors of Messrs. Bradbury and Co., Ltd., recommend the payment of a dividend of 10% on the preference shares for the half year and 5% on the ordinary shares for the year (both free of income tax). Together this will absorb £3,763 2s., and carry forward the balance of £11,237 0s. 3d.

### The United Kingdom and Canada.

It is reported that at a recent meeting of the Winnipeg Board of Trade (Chamber of Commerce) a new standing committee was appointed for promoting trade between the United Kingdom and Canada. The committee is to be known as the Imperial Trade Committee of the Winnipeg Board of Trade, and it is prepared not only to answer all questions from British manufacturers bearing on the trade within the Empire, but to receive and have displayed samples from British manufacturers. Communications should be addressed to the Secretary, Imperial Trade Committee, Winnipeg Board of Trade, Winnipeg.

### Coal Gas as Fuel.

In last week's issue of *The Light Car* there appeared an article, "The Coal Gas Bubble." This is nothing to do with Coal Tar Soap, but deals with the utility of the various efforts that are being made to use coal gas as a fuel for light cars. It is pointed out that the bulk or weight of the gas storage equipment practically debar the idea from success, and we may add that, even if some effective method of using coal gas were introduced, the authorities would probably bring in some new restriction, while it is conceivable that a bad smash with a gas car would be unpleasant.

A coal gas motor omnibus is illustrated on this page, and the size of the gas receptacle, which holds sufficient to

## SPECIAL FEATURES

DARTMOOR AS A TOURING CENTRE.  
COOLING THE ENGINE INTERNALLY. A HOME-MADE VARIABLE GEAR.

convey the vehicle only ten miles, gives some idea as to how impossible the scheme would be for a motor cycle. It would be necessary to carry the gas bag on a special sidecar chassis. Would it lift on corners?

### For Testing Purposes.

It is well known to our readers that Messrs. A. J. Stephens test all their engines on the bench by the use of coal gas. It is found that the engines run considerably better on this fuel than on petrol, and that they develop less power.

### A Stolen Motor Bicycle.

In the August 2nd issue of *The Motor Cycle* in "Current Chat" mention was made of the fact that Mr. J. E. D'Eath had had his motor bicycle stolen from him. Mr. D'Eath now informs us that a man was caught together with a friend, on the stolen motor cycle at the end of last month. During the proceedings in court it was alleged that they had given two worthless cheques in exchange for a Triumph and sidecar and a Rudge-Multi. The case, we understand, is to go to the Old Bailey and to be heard on September 4th.

### The Fascination of the Road.

Flying men say that after the thrills of novelty are worn off, flying (amidst peaceful surroundings) becomes deadly dull compared with motor cycling. There are no sudden changes of scenery or wayside incidents to enliven the spin, and a three hours' journey by plane is quite a monotonous affair.

### Universal Petrol Shortage.

Recent news from America conveys the idea that petrol scarcity is seriously to be expected out there. It is quite conceivable that ere very long American motorists will be suffering the irritation of the petrol permit.

### The Ladies' Ideal Mount.

Our paragraph on this page some weeks ago anent the most suitable machine for lady drivers has brought a variety of conflicting opinions, which seem to indicate that there is no one machine which can be set down as superlative as a lady's mount. We think that a light two-stroke, having a hand-controlled clutch, kick starter, single lever carburetter, and chain-cum-belt drive, would fill the bill as well as anything.



### SAVING PETROL.

The huge gas bag or tank fitted to the motor 'buses running between Shoreham and Brighton shows how utterly impossible is the use of coal gas on motor cycles unless in a compressed state. This quantity of gas is capable only of running the 'bus ten miles. The size of the tank required for a hundred miles run can well be imagined.

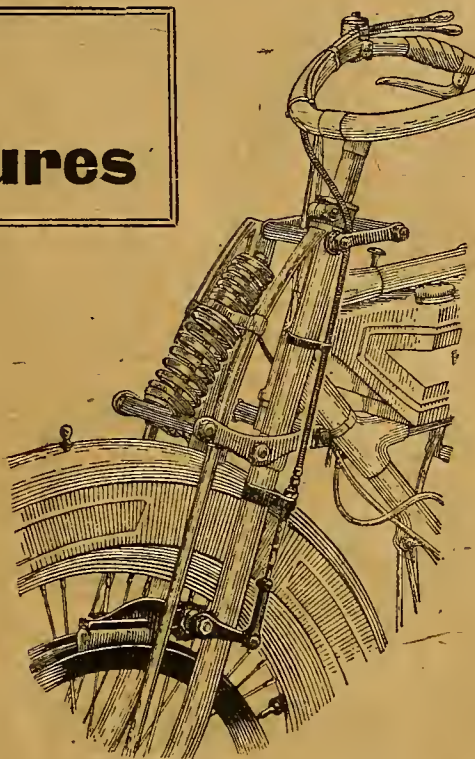


## Some B.S.A. Exclusive Features

No. 5.

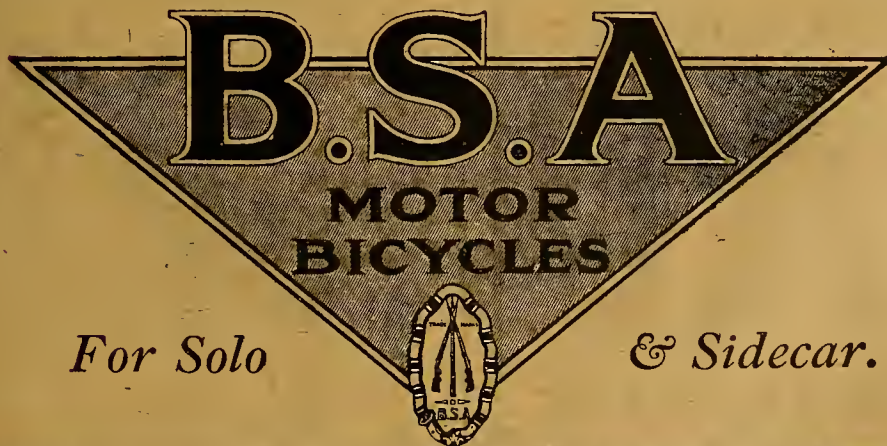
B.S.A. BRAKES.

**T**WO extremely powerful brakes are fitted to the B.S.A. Motor Bicycle, the front being applied by an inverted lever on the handle-bar, and the rear by a foot pedal. Both brakes operate on special brake rims and allow the wheels to be removed without detaching any brake parts or disturbing the adjustments. The efficiency of B.S.A. Brakes and their strength and reliability, fully justify the confidence which riders of B.S.A. Motor Bicycles repose in them.



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Branch of the Imperial Tobacco Co.  
 (of Great Britain and Ireland), Ltd.  
 P. 653

Regimental Uniforms:  
 Indian Army Imperial Cadet Corps.



### The National Relief Funds.

At the week-end the principal relief funds stood as follow:

The National Relief Fund (distributed £5,641,622) .. ..	£6,218,699 0 0
British Red Cross Fund .. ..	7,182,889 19 11
Tobacco Fund .. ..	135,300 0 0

### The Overloaded Single.

Among the few machines on the road this August holiday, the overloaded single, with its badly aligned sidecar, was as painfully prominent as ever. Truly, the alignment of the average tank Holiday outfit is appalling!

### Petrol for Soldiers.

A letter in this issue under the above heading touches upon one of the greatest hardships of the present petrol position. It is certainly bad luck that those who have been abroad for long periods on the country's service should be unable to use their machines, which often afford the sole means of visiting their friends, when at length leave is obtained; and we would urge again that short leave permits be issued for men at home from abroad. The problem is, we admit, a knotty one, but it is not insurmountable, and the amount of petrol used in this way would be small.

### Sidecar Drivers Wanted.

There are a few vacancies for motor cyclists in the Transport Department of the Metropolitan Special Constabulary. Men with sidecar combinations are particularly required. Mr. A. C. Harnden, Director of Transport, in his letter to us, states: "When some time since you were good enough to insert a similar intimation, there was no difficulty in filling all the available posts, and I am sure that amongst your numerous readers there are many who will be willing to devote a few hours each week to the useful work, which has been carried on continuously since the outbreak of war by those who have now been called to wider and more strenuous service in His Majesty's forces. Full particulars may be obtained from Room 589, Scotland House, New Scotland Yard, London, S.W.1."

### Alcohol as Fuel.

On reading an article in this issue entitled "Industrial Alcohol," motor cyclists will learn that this possible fuel will mix readily with water—a fact which many already know. But since a given quantity of the fuel is capable of yielding only a certain number of heat units, it must not be thought that it would be possible to eke out the supply simply by adding a percentage of water.

Recently we have heard stories of motorists going to garages and deliberately pouring water into their tanks. Is alcohol the solution to the mystery?

An increased mileage could (theoretically) be obtained, however, by adding water to the alcohol—up to a certain point. In the present-day engine we have fins to dissipate the heat, but in the alcohol-water engine this heat, instead of being wasted thus, would automatically be absorbed by the water vapour, thus causing expansion. We may yet have silent-running engines with cylinders of the Thermos flask variety.

### Triumph Cycle Co., Ltd.

Shareholders of the Triumph Cycle Co., Ltd., are being called to an extraordinary meeting to be held on the 20th inst. for the purpose of passing, if thought desirable, resolutions (1) to capitalise the sum of £160,000, being part of the undivided profits of the company; (2) for the share capital to be increased to £290,000 by the creation of £160,000 new ordinary shares of £1 each. On these resolutions being confirmed at a later meeting, it will then be proposed that the sum of £130,000 now standing to the credit of the company's general reserve, and the sum of £30,000 standing to the dividend reserve, be applied as dividend at the rate of £2 per share, free of income tax, on the issued ordinary shares, and that this dividend be applied in payment in full of 160,000 ordinary shares, the shares to be credited as fully paid and distributed amongst the holders at the rate of two new ordinary shares for every one ordinary in satisfaction of the dividend.

### Origin of a Rumour.

It is possible that reports current concerning the sale of war-worn motor cycles and lorries at a certain M.T. depot are due to two auctioneers' boards erected amongst the dumps and in view from a railway and main road. On one the lettering is "For sale," and on the other board, "To be sold." A hurried glance suggests the sale refers to the motors instead of the freehold land. Both boards have been there for some time.

### AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average. The word "combination" indicates a sidecar outfit as supplied by the makers, while "sidecar" implies that the fitting has been carried out by the owner.

		Average last week.	Previous weekly average.
A.B.C. ....	1914 3½ 2-speed .....	—	£110
Abingdon ..	1914 5-6 3-sp. sidecar ..	—	£54
A.J.S. ....	1916 6 combination ..	—	£92
" .....	1914 6 combination ..	£68	£60
" .....	1916 4 combination ..	—	£78
Allon .....	1916 2½ 2-speed .....	—	£32
" .....	1914 2½ 2-speed .....	—	£27
Ariel .....	1915 3½ 3-speed .....	—	£43
" .....	1914 5-6 combination ..	£49	£51
Bat .....	1914 6 3-speed .....	—	£49
Bradbury ..	1914 4 2-sp. sidecar ..	—	£41
Brough .....	1916 3½ 3-speed .....	—	£55
B.S.A. ....	1916 4½ sidecar .....	£70	£64
" .....	1915 4½ sidecar .....	—	£55
Calthorpe ..	1916 2½ 2-speed .....	£30	£29
" .....	1915 2½ 2-speed .....	£26	£26
" .....	1916 2½ 2-stroke .....	—	£29
Clyno .....	1915 2½ 2-stroke .....	—	£25
" .....	1914 6 combination ..	£69	£64
Connaught ..	1915 2½ 2-stroke .....	—	£24
Douglas .....	1916 2½ 2-speed .....	—	£45
" .....	1915 2½ 2-speed .....	—	£42
" .....	1914 2½ 2-speed .....	£43	£35
Enfield .....	1916 6 combination ..	£33	£31
" .....	1915 6 combination ..	—	£70
" .....	1916 3 2-speed .....	£45	£45
H. Davidson ..	1916 7 combination ..	£86	£85
" .....	1915 7 combination ..	£60	£66
Henderson ..	1916 7 combination ..	—	£100
Humber .....	1915 6 combination ..	—	£60
Indian .....	1916 5 combination ..	—	£70
" .....	1916 7-9 combination ..	£90	£81
" .....	1915 7-9 combination ..	£57	£67
James .....	1916 4½ combination ..	—	£70
" .....	1916 2-speed 2-stroke ..	—	£31
Lea-Francis ..	1916 3½ 3-sp. sidecar ..	—	£93
" .....	1915 3½ 3-speed .....	—	£55
Levis .....	1916 2½ Popular .....	£27	£26
" .....	1915 2½ Popular .....	£19	£20
Matchless ..	1915 7 combination ..	—	£82
New Hudson ..	1916 2-speed 2-stroke ..	£28	£28
" .....	1916 4 combination ..	—	£60
New Imperial ..	1916 2½ 2-speed .....	£30	£33
" .....	1915 2½ 2-speed .....	£25	£27
Norton .....	1916 3½ 2-speed .....	—	£52
" .....	1915 3½ T.T. ....	—	£43
P. & M. ....	1915 3½ combination ..	—	£65
" .....	1914 3½ 2-speed .....	£50	£50
Premier .....	1915 2½ 3-speed .....	£30	£28
" .....	1914 3½ 3-speed .....	—	£47
Rover .....	1916 3½ 3-speed .....	—	£52
Royal Ruby ..	1916 2½ 2-stroke .....	—	£24
Rudge .....	1916 3½ Multi .....	—	£45
" .....	1915 3½ Multi .....	£39	£38
Scott .....	1916 3½ combination ..	£75	£56
Sun .....	1915 2½ 2-speed .....	£20	£20
Sunbeam .....	1916 8 combination ..	£105	£100
" .....	1916 3½ solo .....	£69	£76
" .....	1915 3½ combination ..	£75	£74
Triumph .....	1916 2-speed 2-stroke ..	£40	£37
" .....	1915 4 countershaft ..	—	£55
" .....	1915 2½ 2-sp. 2-stroke ..	—	£25
" .....	1914 3½ 2-sp. 2-stroke ..	—	£41
Velocette ..	1915 2-speed 2-stroke ..	£33	£25
Zenith .....	1915 8 Gradua .....	£58	£61

### MUNITIONERS UNDER CANVAS.

Many Midland munition workers spent the August recess under canvas in the woodlands of Stoneleigh Deer Park, the little Levis two-stroke proving a most useful adjunct, especially when there was shopping to be done.







## WHAT SHALL WE CHOOSE?

IT is interesting to read the pros and cons put forth by different riders in reply to the query that appeared in the editorial columns a few weeks ago anent the best machine for a lady. One rider having obtained satisfaction and pleasure from a certain type of mount will plump for the make every time, scarcely allowing that all designs have their good points and possibly a few failings. Everything depends on the type of woman; one person will feel "wobbly" on anything with a higher-powered engine than an autowheel, whilst competent drivers will handle a big single or twin with dexterity. A great deal of the confidence acquired is due to knack and skill, and it would be best for nervous women to keep to low-powered open-framed mounts.

I have ridden many makes of motor cycles, and I should be undecided which to recommend, unless I

Levis, and a Clyno. Any of these machines would have been a good investment for a beginner, or even an experienced rider.

### Two-strokes.

There are points in favour of the two-stroke machine. Some riders contend that it is the lightweight of the future, but, all things considered, I personally favour the four-stroke. The two-stroke will climb well, but not so well as the four-stroke with three speeds.

If price were no consideration I would drive a big four-stroke sidecar combination and a light two-stroke with single gear for short journeys and fairly level roads. A little single-gear machine rides with more life than one that is encumbered by the extra weight of gears. Although not such a go-anywhere mount, the two-stroke is usually cheaper owing to dispensing



Many lady riders prefer the ordinary type of frame to the open variety.

had a fair idea of the tastes and disposition of the rider. For solo work a  $2\frac{3}{4}$  h.p. engine is as useful as any, as it has sufficient speed for practically all purposes without the need for great weight in the frame and fittings. I remember, amongst others, the pleasure I derived from a lady's Douglas, a Velocette, a



Miss Rosina Higgs, a hospital nurse at Dartford, uses her Douglas for the purpose of riding from her home in Reading to her work at Dartford.

The ordeal of the interviewed.

with valves and timing gear; but the initial cost is not the only one to study. Again, it is claimed for the four-stroke that consumption of petrol is lighter. This is certainly so, but most women will find that tyres are a bigger item than fuel. A gallon of petrol will carry one such a long distance that the few pence spent in that direction are hardly felt.



## Through Feminine Goggles.--

Nowadays many women despise feminine attire, and a modification is certainly necessary for many occupations. For myself, I prefer to stick to the frequently scorned skirt, and find it no disadvantage at all when motor cycling, although I may claim to have had a fair share of experience; but I can also admire some of the neat copies of masculine attire donned by some feminine riders. I recently saw a smart outfit worn by a lady on a 3 h.p. Enfield. It consisted of khaki twill knickers, a coat to the knees of the same material, made after the "trench" coat pattern, with soft leggings and boots and crowned by a small hat made from material similar to the costume. It was most suitable for country work of any description, but one would no more care to dress thus for town shopping than a farmer would attend his church wearing a smock. To say that one requires *bizarre* apparel to ride an open-framed mount is absurd. I remember that Miss Hammett, of Douglas fame, never appeared in club runs, or in the much more strenuous reliability trials—in which, by the way, she proved no mean competitor—in any garb at which the most fastidious Mrs. Grundy could cavil. However, as prejudice regarding woman is going to "the wall" in most ways just now, we shall probably soon allow

any kind of weird fantasy in dress to pass without comment.

The majority of fair riders are using diamond-framed machines, partly owing to the fact that the menfolk of the family have entered the forces, leaving their mounts behind, and partly because the manufacturers are too busy and labour too scarce to give any attention to open-framed mounts. The lady in the illustration—Miss Higgs, a hospital nurse, of Dartford—prefers the man's frame, thinking it more rigid than the open variety. Had she been more familiar with the lady's Douglas before purchasing her present model I think she would agree with me that the lady's machine is practically perfect in design and quite fast enough for her purpose. She is able, although almost a novice, to carry out small roadside repairs, and she has never yet experienced a broken valve or any serious breakdown, which speaks well for the machine. She tells me that she considers nothing teaches one the mechanism better than to suffer inconvenience through ignorance. She is amused at the photographs one sees of roadside repairs in some periodicals, as she says the most interesting bit of work requires doing when the camera is left at home, and in moments of emergency one is apt to find that a few reliable tools are worth dozens of pictures.

## Cancellation of Petrol Licences.

**F**OLLOWING the protest made by the Automobile Association to the Board of Trade against cancellation of petrol licences issued prior to April and May last, the following correspondence has ensued between Major-Stenson Cooke, secretary of the Automobile Association, and the Deputy Petrol Controller:

### From the Deputy Controller.

8th August, 1917.

Sir,—I have to acknowledge the receipt of your letter of the 31st July addressed to the Secretary to the Board of Trade, submitting a protest, on behalf of the members of your association, against the recent notice issued by the Petrol Controller, whereby full-duty petrol licences of the first and second issue have now been cancelled.

While it is true that until recently the policy of this department was to permit the purchase of petrol against licences at any time subsequent to the date of issue, no undertaking was given that such policy would be continued indefinitely.

The petrol situation is now more critical than hitherto, and there is small prospect of any material improvement in the near future. The Controller feels compelled in these circumstances to take every possible step to limit the petrol available for civil consumption to purposes of absolute necessity. It is thought that holders of first and second issue licences, which at this late date are not exhausted, have had full opportunity of purchasing and using the restricted quantity of petrol issued against their written statement of requirements, and that, save in a very few exceptional cases, there is no consideration of necessity to justify the extension of the period of the validity of such licences.

The Parliamentary question referred to in your letter would appear to relate to stocks of petrol, which are not affected by the notice issued by the Petrol Controller.

I am, sir,

Your obedient servant,

P. G. L. WEBB, Deputy Controller.

The Secretary, The Automobile Association  
and Motor Union.

### Major Stenson Cooke's reply:

8th August, 1917.

Sir,—I have to thank you for your letter of the 8th inst., in reply to the protest submitted by the Automobile Association against the recent notice cancelling petrol licences of the first and second issue.

This association fully appreciates the importance of preventing unnecessary consumption of petrol, but in view of the fact that motorists have from the commencement of the war placed their cars, personal services, and their petrol allowances freely at the disposal of the country, I would urge they are entitled to more considerate treatment than sudden cancellation of allowances, because their licences have been sparingly exercised.

In reply to your statement that no undertaking was given permitting the purchase of petrol against licences at any time subsequent to the date of issue, I would draw your attention to the following footnote which appeared until very recently upon your forms refusing renewals of licences:

"Your present licence, which is valid until the total quantity of petrol allowed thereunder has been purchased, should be returned to this office as soon as it is exhausted."

I am to point out that many motorists, holding the assurance or "undertaking" conveyed by this footnote, decided not to avail themselves of the Chancellor of the Exchequer's concession permitting them to surrender their car licences on June 30th in return for a refund of half the amount paid in respect of motor car or motor cycle taxes for this year.

In consideration of such motorists having retained full Inland Revenue licences for this year, may it be suggested that your notice cancelling early petrol licences should be strictly confined to those held by motorists who relinquished their car and motor cycle licences on June 30th? If this suggestion be adopted much of the unmerited hardship referred to in my previous letter will be avoided.

I thank you for the assurance conveyed in the last paragraph of your letter that stocks of petrol obtained under early licences are not affected by the recent notice.

I am, sir,

Yours faithfully,

STENSON COOKE (Major), Secretary.



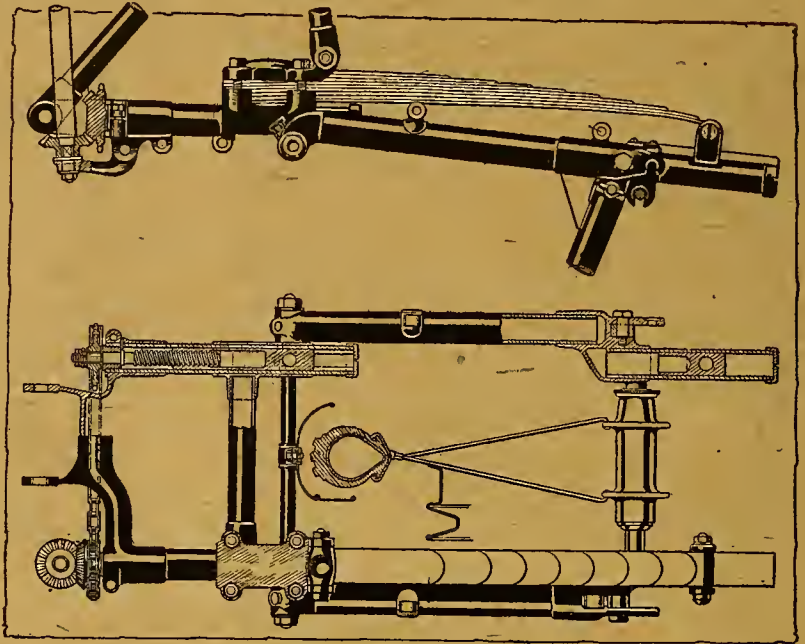
## THE ZENITH SPRING FRAME.

A System of Springing designed for Gradua Gear Machines.

It is at once obvious that in the case of a machine fitted with a Gradua gear, by which the back wheel is to move longitudinally in relation to the main frame, some special provision must be made for the sliding action of the wheel if rear springing is to be incorporated. In the new Zenith spring frame this provision is made without very wide departure from standard Zenith practice, and the accompanying illustrations show at a glance that the manner in which the movement of the rear wheel is effected coincides with the well-tried system employed on the rigid frame models.

In this design the back wheel forks are pivoted to the main frame, so that they can move in a vertical plane independently of the main frame. The leaf springs extend directly above these fork tubes, being mounted on the main frame at their base and shackled to the fork members at their opposite extremity adjacent to the wheel spindle. Thus, any vertical movement of the rear wheel falls directly on the springs which support the weight of the machine, the fork members acting, as it were, as radius rods.

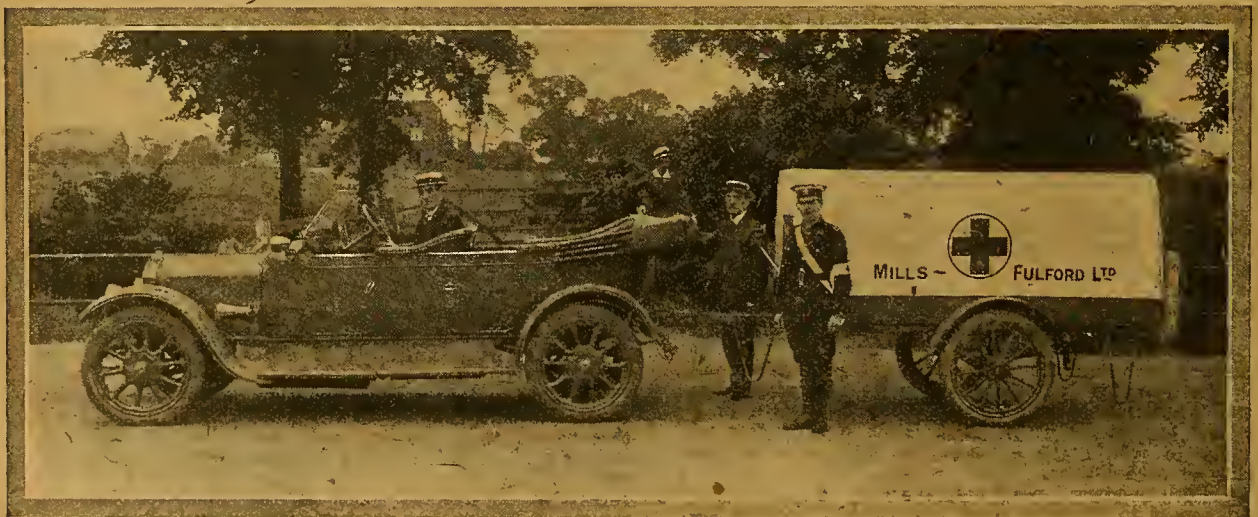
These fork members, carrying the rear wheel, are moved backwards and forwards in much the same manner as in the ordinary rigid frame Zenith-Gradua, but the shackles to which the springs are attached at their rear extremity are so arranged that they can slide on specially faced surfaces, thereby allowing for



A patented spring frame designed by F. W. Barnes for the use of the Zenith-Gradua motor cycle.

the flexibility of the springs and for the necessary variations in the wheelbase.

It will be seen that every provision is made for the exclusion of grit from the sensitive working parts. The design is, perhaps, rather on the heavy side, but probably modifications will be made ere this spring frame model reaches its final stage.



### HELPING THE RED CROSS SOCIETY.

Several of the Coventry firms have purchased trailer ambulances, which they lend to the Coventry V.A.D. for the conveyance of wounded soldiers. Among the firms are the following: Messrs. Alfred Herbert, Ltd., Mills-Fulford, Ltd., Singer & Co., Ltd., Rudge-Whitworth, Ltd., and Coventry Ordnance. One trailer has been presented outright to the V.A.D. by the employees of the Humber Saw Mills Department, and another by the Coventry Gun Club. We hope that this good example will be followed. An inspection of these ambulance trailers by Brigadier-General Quale Jones, C.B., C.M.G., recently took place in the Charterhouse Grounds, Coventry.





## D.R.'S AND THEIR WORK.

(IN FOUR INSTALMENTS.)

### II.—VARIETY OF WORK.

By D.R.

**T**HERE are many different kinds of work allotted to D.R.'s. The work of some men seems of very little importance, but it may prevent much harm being done by enemy spies. I refer to the patrol work done by many D.R.'s.

These men are sent out night after night over certain stretches of road, generally along the sea-shore or in view of the sea, to report on any unusual lights or signalling, and to halt and enquire the business of any stranger in the district. It is very seldom, however, that the motor cyclist patrol actually sees anything to report. The mere fact being known that he is in the district will prevent enemy spies from attempting their work. He soon gets to know the roads very thoroughly, and rides without lights, and so can see without being seen. He varies the times and routes of his journeys and his watching posts at his own discretion, so that no one actually knows where he is at any particular time. For the first few nights on this patrol work, and until properly acquainted with the district, one is inclined to be very suspicious of every light in the neighbourhood. On a very dark night it is quite impossible to judge whether a light is very large and some miles away or very small and only a few hundred yards away. Any light which flickers or frequently becomes obscured immediately arouses suspicions of signalling, and one can almost imagine dots and dashes being signalled across country or out to sea, though, of course, no coherent message can be read. Such lights when investigated usually prove quite harmless, such as a bush blowing to and fro before a light in a cottage window, or a lantern being carried with a swinging motion.

#### The Dangerous Side.

I know of one D.R. who was on patrol duty for several months on the shore of a bay with a very narrow opening, completely hidden from the open sea by an island. On the map this might appear a likely place for a base for enemy submarines to replenish supplies. As a matter of fact the bay was only a few inches deep for an hour at high tide, while at low tide it was all mud and sand. Of course, there never was anything to report, nor was there likely to be, as submarines could not possibly get within miles of the place, nor could any signalling be carried on between there and the open sea.

I have seen a D.R. tearing twenty or thirty kilometres across country and arriving at his destination with such importance that one would imagine that the whole fate of the British Empire depended on the prompt delivery of his despatch. As a matter of fact,

the actual message was a request for a quartermaster-sergeant to exchange a tunic for an orderly room clerk!

But, putting aside the farcical side of a D.R.'s work, there are many D.R.'s who really do good work and carry important messages. Some of them are frequently or almost continually exposed to danger. The casualties from enemy fire among D.R.'s are, however, very few. Enemy machine guns have been trained on portions of exposed roads covered by D.R.'s, and under such circumstances the D.R. is lucky to get past without a single bullet striking him or his machine. Other parts covered by D.R.'s are exposed to shell-fire, but the cute D.R. can sometimes from a comparatively safe place estimate the time between each shell coming over and take advantage of an interval for a dash through the danger zone. I frankly admit I know very little of this dangerous side of a D.R.'s work, as I have never had to go into any actual danger as a D.R. myself. I do, however, hear very thrilling experiences from other D.R.'s who are frequently exposed to danger.

#### Roads.

Yes, D.R.'s have to cover roads and roads (?). In some parts we find only roads (?), and it is very hard lines on the D.R. whose work keeps him entirely on them, but he is probably the man who sticks to his job and makes little or no complaint. There are ruts, pot-holes, mud, and greasy *paré*, and I know what these are like during a thaw after a long spell of hard frost and snow, or with a three-inch covering of snow melting in a few hours. I also know what these same roads are like on a dry windy day when there has been no rain for a week or so. They have already been photographed and described so often that it would be useless for me to try to depict the conditions. But one seldom sees photographs or hears of the very fine, straight stretches of perfectly smooth, level, road regularly covered by some D.R.'s. Though I am inclined to agree that many riders like to enlarge upon the difficulties, I cannot say I have actually seen a road specially prepared with mud and boulders ready for the photographer so as to exaggerate in the press the difficulties of the D.R.'s work, but I have seen D.R.'s taking quite unnecessary rides over the very roughest tracks and having their photographs taken in places where they never have any actual duty.

(To be continued.)

#### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.



# GREAT AMERICAN RECORDS BEATEN.

"Cannonball" Baker's Remarkable Speed Record Eclipsed.

**L**ESLIE PARKHURST, astride a 1917 Harley-Davidson, officially checked and scored by the Federation of American Motor Cyclists, covered 1,452 $\frac{3}{4}$  miles between 7 p.m. July 19th and 7 p.m. July 20th on the two-mile board speedway at Sheepshead Bay, N.Y. Parkhurst's feat eclipses the present twenty-four hour solo record—made three weeks previously by E. G. Baker on an Indian at the Cincinnati Speedway—by 66 $\frac{1}{2}$  miles.

Parkhurst also made new records for the 500 miles and 1,000 miles, riding the former in 7h. 35m. 17s. and the latter in 17h. 8m. 28s. Baker's record figures for the distance, also made on the Cincinnati Speedway, were 8h. 38m. 30s. and 17h. 26m. 30s. respectively.

Parkhurst lost 3h. 45m. due to rain, tyre, and fuel stops. His average speed, based on actual riding time of 20h. 15m., was 71.24 miles an hour.

Otto Walker, with Carl Lutgens as sidecar passenger on a Harley-Davidson-Rogers sidecar combination, and riding the track simultaneously with Parkhurst, succeeded in adding 158 $\frac{3}{4}$  miles to the twenty-four hour sidecar record made by C. F. Bruschi—also on a Harley-Davidson—a month ago at El Centro, Cal. Bruschi rode an even 1,000 miles in the interval, while Walker piled up a mileage of 1,158 $\frac{3}{4}$ . Walker made nine stops, aggregating 1h. 24m., so that his actual running time was 22h. 36m., and his average speed, based on this figure, 47.02 miles an hour.



Leslie Parkhurst, third from left in sweater, stops for adjustments during his ride of 1,452 miles in twenty-four hours.

Otto Walker and Carl Lutgens, who succeeded in adding 158 miles to the twenty-four hours American sidecar record.

## PETROL FOR AMERICA.

A Critical Position: The Question of Demand and Supply.

**T**HAT the petrol situation in America bids fair to approximate conditions now prevailing in Europe can be gathered from the fact that Senatorial conferences, now working on the Government's food and fuel conservation, intend to place petrol, paraffin, and other fuel oils under Government control as a means of preventing wastage.

Following closely on the heels of this announcement comes a warning from A. C. Bedford, president of the Standard Oil Co., to the effect that if we are to be ensured a sufficient supply of the hydro-carbon fuel to win the war, motoring activities along pleasure lines must be curtailed, if not stopped altogether.

Mr. Bedford said: "If our Government is to have the petroleum it will need to prosecute the war successfully and supply all necessities directly growing out of the war, two steps will have to be taken, viz.:

"(1.) The public will have to economise in the use of petrol. Sufficient petrol should be available to provide for all the normal uses of automobiles. But pleasure riding should be curtailed. People should look upon their automobiles as necessities to be used

only when needed. Not a gallon of petrol should be used except for some useful end.

"(2.) Every oil-producer in the country should be encouraged as a patriotic effort to secure the utmost possible output of crude oil."

Against the pessimistic view of the situation taken by Bedford comes the statement from Henry L. Doherty, president of the Cities Service Co., and second largest producer of refined oil in America, to the effect that if the public adopts Bedford's suggestion for relieving the situation the curtailment of pleasure motoring will speed the petrol famine.

In substantiating his statement Doherty brought out the fact that the cost of drilling oil wells is almost prohibitive at the present time, and with the Government willing only to pay two cents a gallon for fuel oil, the oil men depend for revenue on the operators of motor vehicles, who are willing to pay up to thirty cents a gallon for petrol. With the profitable end of their business cut off, according to Doherty, all incentive for the oil producers to drill more wells and increase the supply will be stopped.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

### ACTION AND REACTION ARE EQUAL AND OPPOSITE.

Sir,—I should like to ask "Mohandis" the following question: If, as he says in *The Motor Cycle*, page 135, "the engine causes the tyre to exert a backward force on the road surface" and "the road exerts an *equal* and opposite reaction on the tyre," what pushes the machine forward? Surely an *equal* "reaction" would merely cancel the "action," and an equilibrium result? T. RAE.

### WHY NOT ACETYLENE?

Sir,—Why cannot we get at the bottom of the difficulty in the use of acetylene gas in petrol engines? Let some of our qualified scientists give their opinion and advice, and let us see what can be done. One might even offer a prize for the first successful trial of acetylene gas on a motor cycle. Hundreds of motor cyclists would willingly subscribe money towards a prize, and the war has made us master worse difficulties than this. Let the motor cyclist master his own problems. It would be a lasting boon. Liverpool. McADAM.

### TWO-STROKE PISTON RINGS.

Sir,—I am interested in the correspondence on the benefit of Oildag on piston rings, but I should like to know whether its use has any disadvantages.

I have used it for a short time in a  $3\frac{1}{2}$  h.p. four-stroke engine, and found the rings in a much better condition than usual. But I also found metallic flakes inside the piston, evidently caused by the Oildag being burned or melted.

Now I should like to know if there is any danger of the flakes falling into the crank case and doing damage. Canterbury. I.W.G.

### INVERTED CONTROL LEVERS.

Sir,—My attempt to raise the question of the anatomical aspect of inverted control levers has elicited criticism from three gentlemen, none of whom has succeeded in refuting the opinion I expressed in my original letter—namely, "that the entire contour of the normal type Bowden lever gives the complex muscle system of the hand a correctly-graduated load."

My own driving system involves regular use of both valve lifter and front brake levers—the former for coasting downhill with the throttle shut, the latter for all minor decelerations if the machine is travelling in a straight line. In a hundred miles run, therefore, as I have made considerable use of both levers, I appreciate the type which requires the minimum effort. Someone might try the experiment of fitting his handle-bar clutch control to an inverted type lever, use it for a month, and publish his results.

In reply to his criticism, perhaps "A.H.F." will substitute "onns of operation" for "hard work," and realise that I used the term "hard work" to differentiate between the varying degrees of leverage provided by the different portions of any lever. In reply to the Rev. R. C. Measures's questions I may say:

(1.) I have already explained that I use both levers to a considerable extent.

(2.) I find that for any given operation the normal type requires less effort.

(3.) Delicacy of control applies principally to the front brake lever. With the normal type lever the requisite pressure for a gradual deceleration can be more easily and "delicately" applied. Locking of the front wheel, always an unpleasant happening, is thereby avoided.

The Rev. R. C. Measures implies that what the manufacturer gives us is, *ipso facto*, correct. Perhaps the percentage of inverted type front brake levers, as fitted to a certain machine here, that remain operative after a short period of active service would surprise him, but I leave that side of the question in the abler hands of "Chinook." A. LINDSAY, CAPT., R.A.M.C. B.E.F.

### AVERAGE SPEED.

Sir,—I am inclined to agree that a high average speed, covering a long distance, requires an extraordinary mount and extraordinary luck as regards conditions. A run of 106 miles, non-stop, from London to Bournemouth I once accomplished in 2h. 45m. on a not-too-much-faked  $3\frac{1}{2}$  h.p. N.S.U. (before the war!); this is an average of 38.5 m.p.h., and meant a speed of over 50 m.p.h. whenever I got the chance. On trying London-Torquay (about 212 miles), my time rose to 7h. 10m., not including a stoppage to refill, making the average speed fall to 29.5 m.p.h.

The 'bus in question was well known in a certain part of London as being faster than the average single. I have never beaten the time for the former run on 5 h.p. and 6 h.p. machines that I have since possessed, though the latter, a 6 h.p. Bat-Jap, is faster than the N.S.U. when it comes to a "dust-up." I find there is always something that goes wrong with the twin when driven at these speeds, though the engine is not taxed so much.

B.E.F.

USCANOPIT, R.F.C.

Sir,—"Armidug," in your issue of July 26th, claims to have motor cycled from Arnèke to Saint Omer at the average speed of 47.85 m.p.h. He states the distance to be twenty-three and threequarter miles; this makes his time to be nearly thirty minutes. But the actual distance between these two towns, by main road through Cassel and Arques, is only sixteen miles; so his average speed amounts to about 32 m.p.h., which is what one might reasonably expect. There are at least two other feasible routes which he might have taken, the lengths of which are fourteen miles and ten and a half miles respectively.

(PTE.) J. C. BENNETT MITCHELL, M.M.G.S.

B.E.F.

Sir,—We read in your issue of July 26th, with an amount of interest, of "Armidug's" performances on a  $2\frac{3}{4}$  h.p. war model Douglas, and we were surprised.

In the first place, Arnèke is only a matter of ten miles from Saint Omer, and, even if a circuitous route were taken to strike the main Cassel road, the distance is only about twenty-three kilometres! We suggest that "Armidug's" calculations became somewhat mixed. The "stop watch" used must have stopped for quite a considerable time.

Supposing, however, the distance to be correct, an average speed of 47 m.p.h. is rather a tall order for a machine that can only do 52 m.p.h. in a "flying kilo," and we have yet to find the "war model Douglas" that, with only "a tuning up," can do much over 40 m.p.h., even if the roads here would allow of it, and even at this speed the engines soon overheat with the petrol and oil as supplied on active service. THE SCRUFFS, D.R.'s, R.E.

P.S.—"The Scruffs" include one D.R. who has a much stronger claim to being "the youngest D.R." than Cpl. Roughley, whose photograph appeared in the issue of July 26th, he being only 17 years 1 month on his arrival in France sixteen months ago.



### PETROL FOR SOLDIERS.

Sir,—I am writing to ask if you think there is any possibility, supposing I am able to get home on leave, of obtaining any petrol for my motor cycle. I left England in August, 1915, and so when I get home—if I do at all—I shall have been well over two years continuously on active service without a single day's leave.

Under the circumstances I think it pretty hard luck if I am not allowed a few gallons for use during the fortnight or so I am at home, especially living, as I do, well away in the country, for with a restricted train service a motor is the only means of seeing the people one wishes to see. As a matter of fact, I had only about four months use of my Inland Revenue licence in 1915, as I renewed it about April and did not use the motor cycle after the end of July.

Your paper is one of the joys of life. I have had it posted every week since I left home, and have lost few copies.

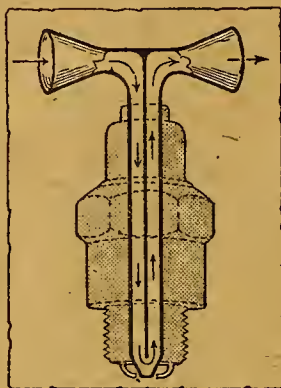
KENNETH DAWSON (Capt.)

### COOLING THE ELECTRODE.

Sir,—In *The Motor Cycle* of May 10th "The Critics" continue their most interesting discussion about plugs, and, in view of what the four gentlemen say, I would like to suggest making the central electrode of sparking plugs hollow, with a double bend at the top open to the air, the bottom being pointed and closed, the idea being that one opening being pointed to the direction of travel, the rush of air would always keep the electrode comparatively cool. I am not an engineer or a mechanic, but the idea may be feasible.

GEO. J. HIDE.

Buenos Ayres,  
Argentine Republic.



Cooling the central electrode  
by air circulation.

### THE CRITICS.

Sir,—I like "The Critics" as much as anything in your paper. I often wonder if these are genuine conversations. They surely must be, because "D.R." exhibits all the limited intellect which I have frequently observed amongst D.R.'s, and "Manufacturer" is absolutely typical of the half-educated, pigheaded, purblind tinker who sets up to design motor cycles for the greatest Empire in the world.

In a recent issue "Manufacturer" unloaded a lot of heavy sarcasm on riders who ventured to interfere with the silencing arrangements as provided by the maker. The silky silence of a Harley or a Henderson is a joy to me, but I discard the silencers of most British productions simply out of self-defence, because I cannot stand the filthy jangle of the timing gear. "Manufacturer" calls this swank, though, personally, I can see nothing very swanky in making a hideous din. As the revolutions of the average British engine are usually grievously disproportionate to the speed, a noisy exhaust merely gives the show away. "Manufacturer" excuses his beastly timing gear by a little hot air about the superiority in volumetric efficiency of the British engine. What in the world has volumetric efficiency to do with the private owner? May the powers defend me from any more volumetric efficiency! Just when you want it, it is not there. As a matter of fact, it never is there except for the first half-mile after starting from cold.

I assert with deep regret that at the present moment our manufacturers are years and years behind the Americans in the quality and performance of the machines they are turning out. Some ten years ago the British industry had an absolute lead, due, in my opinion, to two things, namely—(a) the Triumph Cycle Co., and (b) the natural aptitude of the British public for this form of locomotion. All honour to the Triumph Cycle Co. They made motor cycling possible, and have produced a type of motor cycle which, though personally I consider it an undesirable type, is nevertheless an engineering job from stem to stern. But what of the others? (1.) The pitiful two-stroke. (2.) The feeble and remote copy of the Triumph. (3.)

The awful pile of wires and sprockets, rods, knobs, spikes, and angles hung promiscuously round a ponderous framework, and sold at a price in excess of the Ford car.

I could go at length into the points of superiority of the Yankee machine only I am getting fed up with writing. It is sufficient to say it is superior on all points, and if anybody likes to argue about it I can supply some pages of facts and figures from my personal experience to support it.

Now, I do hope the British industry will get a move on. It has got another year at least before the struggle begins, and I venture to present the following suggestions absolutely gratis: (1.) It is worth paying a properly trained engineer in the designing department. (2.) Decide whether the machine is to be for solo or sidecar use, and scrap the dual purpose idea. (3.) The price must come down. (4.) The weight must come down. (5.) The "volumetric efficiency" (ugh!) must come down, and the power required must be supplied by c.c. sufficient to do it.

London, S.W.

HOWITZER, R.G.A.

[We do not share our correspondent's conviction. It would be very simple to ignore volumetric efficiency and accept the obvious alternative of piling up the c.c., but this would tend to deaden progress.—Ed.]

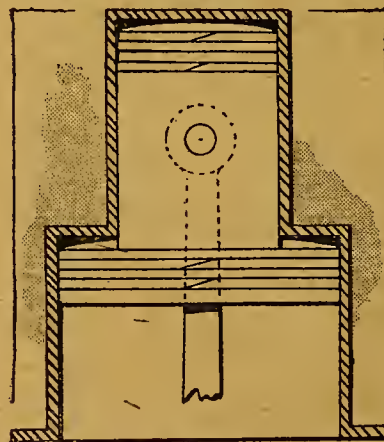
### EXHAUST GASES.

Sir,—I often wonder why motor manufacturers, in their intense keenness to get the utmost power and speed out of their engines, still, after nearly forty years of motor building, lead the exhaust pipes downwards and make the exhaust gases travel a zigzag course before entering the silencer. Hot exhaust gases have a natural tendency to rise, apart from the fact that they get kicked upwards violently by the ascending piston, and a certain amount of back pressure must be caused by making these gases do an "about-turn" when they come to the top of the cylinder, and are forced down the exhaust pipe. I should think it would not be a difficult matter to keep the exhaust pipe level with, or in some engines higher than, the top of the cylinder. The silencer might be fastened to the stays of the carrier. The exhaust pipe would be nearer the tank certainly, but I think if it were bound round with asbestos there would be little danger of fire.

B.E.F.

W.G.C.

### DOUBLE-ACTING FOUR-STROKE ENGINES.



A suggestion in the construction of a  
double-acting four-stroke.

Sir,—In reference to the double-acting engine illustrated recently in *The Motor Cycle*, I think that the machine work and erection could be very much simplified if the system as per enclosed sketch were adopted. It is used very much on compound single-acting straight line air compressors.

In the sketch I have merely shown the outline of the cylinder and piston without any valve pockets.

GEO. B. HALLAM.

### SIDECAR V. RUNABOUT.

Sir,—Regarding your correspondent "More Comfort's" letter in your issue of the 2nd, I should like to add that my experience is very similar to his. Before the war I obtained a great deal of pleasure from a  $4\frac{1}{2}$  h.p. combination, but have since been asking myself the question, is the modern combination worth while at its price? I have come to the conclusion that it is not, and my post-war machine will be a Morgan, Scott, or cycle car.

I am rather afraid manufacturers had better revise their ideas concerning the combination. The war will see its days numbered.

J.L.



## TWO OR FOUR-STROKE ENGINES.

Sir,—I have been very interested in your series of articles entitled "The Critics" ever since its inception, and I feel I must say a few words of praise on behalf of the light 2½ h.p. four-stroke.

My own mount is as fast as I could wish; and as for hill-climbing, it has successfully negotiated the Old Wyche, Malvern, with its gradient of 1 in 2.9. I think it in all ways superior to the light two-stroke of the same power. Its petrol consumption is low, and it will keep up a high average rate of speed for many miles without overheating.

I have touched 50 m.p.h. on my machine, and this without any freak tuning, etc., or anything beyond the attention of an enthusiastic owner. I add the usual disclaimer.

Berkhamsted.

CALTHORPE-J.A.P.

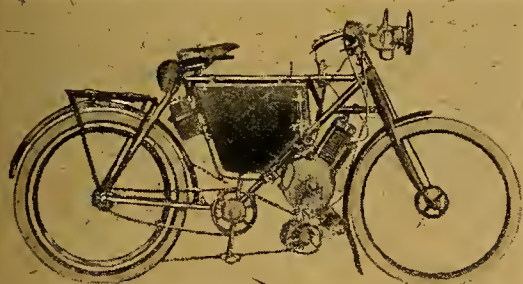
Sir,—Being a keen motor cyclist and reader of your paper for the last ten years, I feel it is only right that you should have my opinion of two-strokes, as they are only too often scoffed at. My machine is a standard model Connaught, purchased last October, since when I have been doing constant riding to and from the different camps in my district. The total mileage run is now 3,500, the belt has been shortened once only, and the back tyre is apparently good for another 3,500. From start to finish I have averaged 160 miles per gallon with a 26 jet, can touch 45 m.p.h. on a good road, and cut a figure of 8 on any main road without four-stroking, so you can judge that the engine is flexible. I might mention that I have fitted Terry's spring links to the front forks, and find them a great success on present day roads. But the thing is the Clair silencer; this was fitted without any difficulty underneath the crank case, which I find a good position, as it has a tendency to warm the gases before they are transmitted to the cylinder, but the quietness is sometimes dangerous in country lanes. This I can say, the hiss from the carburetter is now louder than the exhaust. To ride such a machine with its gentle pulling motion upon opening the throttle is far better than a four-stroke, with its "snack, snack, snack." However, every rider has his particular fancy, but give me a Connaught, and I am happy.

I wish the makers of this machine and your good selves every success, as it is owing to your paper and the makers of such machines that we are able to have a little relaxation in these strenuous times.

F. ENGLISH.

## AN EARLY COUNTERSHAFT GEAR.

Sir,—I am enclosing a photograph. As you see, it is an old machine, built in 1903. It has, of course, accumulator ignition. The chief interest, however, lies in the countershaft and handlebar-controlled clutch. This was the only



Handlebar-controlled clutch in 1903.

Bowden control on it. Front brake, exhaust lifter, throttle, and ignition, all were controlled by rods and levers. Note the band brake on the front wheel, also the long induction pipe and detachable cylinder head. The machine used to go, too, and several times made the journey from Buxton to Sheffield. I may add that up till recently the machine was running about Sheffield, and I got much fun out of it.

By the way, "Ixion" is an authority on plugs for flat twins. Has he ever tried (a) the Jap plug, sold at 2s. 6d.; (b) the Oleo car type, No. 7, 4s. 6d.? The latter has a big brass body, keeps cool, and looks nice if polished. I have found it splendid.

G. F. JONES.

## A COMMONSENSE CARRIER PLATFORM.

Sir,—All riders know how difficult it is to fasten parcels of perhaps varied shapes on to their carriers and find them safely there at the end of a journey. With the platform I suggest absolute safety is secured, and parcels are strapped or tied on almost instantaneously. The platform or grid is made of strong iron round the outside, and a stout wire mesh across—strong enough to stand the necessary pulling up of straps. The mesh is 1½ in. or 1¼ in. square, and, with a strap 1 in. wide interlaced, no moving or shaking off during the longest journey can be possible; and parcels can be fastened in the centre as easily as a parcel occupying the whole of the platform.

It may be possible to adapt this idea to many of the motor vehicles used for luggage, as the mesh could be made for straps or ropes, and of a strength necessary for the luggage. It would, I think, too, be an improvement on some of the motor car platforms, on which one sees passengers' luggage strapped or tied in very ungainly looking positions.

S. T. CHESHIRE.

## CARBURETTERS.

Sir,—Having noticed from time to time in your paper references to different makes of carburetters, I should like to state mine for the benefit of others. I have a Levis 2½ h.p. two-stroke lightweight motor cycle, fitted with Enfield two-speed gear and all-chain drive; this machine I found splendid in every detail except the carburetter, which would not allow the machine to start easily or run slowly without four-stroking. I tried several other well-known single jet makes with no better results, and finally ordered a three-jet Binks. This instrument was delivered in four days and fitted the machine perfectly—in fact, I had it on within five minutes of opening the parcel. In half-an-hour I had mastered the instrument, and the transformation it has made to the Levis is marvellous: it two-strokes perfectly at slow speeds, and I am now able to use my free engine and clutch in traffic without the engine racing. The machine will attain a speed of forty miles an hour and uses less petrol.

My lighting is electric by means of A. H. Hunt's dry batteries and lamps, and gives every satisfaction.

C. RUSSELL (LIEUT., R.E.)

## MOTOR CYCLE DESIGN.

Sir,—It has occurred to us that a few notes on the general design of motor cycles, from the rider's point of view, might be welcome, now that manufacturers' thoughts are turning to post-war models.

Here we have dealt only with what we consider to be faults in design and construction, though doubtless some of these are matters of personal opinion.

One great fault of many motor cycles is their general inaccessibility, especially in reference to the power and transmission units. This we consider deserving of more attention than it has so far received.

The next point is the need for better springing and larger tyres. Fully 50% of the motor cyclist's troubles have as origin the effects of excessive shock and vibration.

With the increase in weight and power of sidecar outfits the need for better brakes becomes imperative. Front brakes on solo motor cycles are dangerous, and on heavy combinations are almost useless. Rear brakes should be in duplicate, preferably of the external contracting and internal expanding type. Rear brakes of the type adopted from ordinary cycle practice are usually unsatisfactory for checking heavy outfits.

Brake controls, in our opinion, need attention. Foot brake controls, which have bends to avoid belt, gear box, etc., or which dive underneath the power unit and reappear on the other side, are to be condemned. Designers should remember that intricate controls look exceedingly nice in the showroom, but are apt to cause trouble after a month or so of winter running.

Again, silencers might receive more attention than they do. Two-strokes and lightweights generally seem to be ill provided for in this respect.

Composite motor cycles seem to suffer from defects in design more than those which are practically built throughout in the same factory. Probably this is largely a matter of cheapness. But there is, and always will be, a market for seemingly expensive, well designed motor cycles.

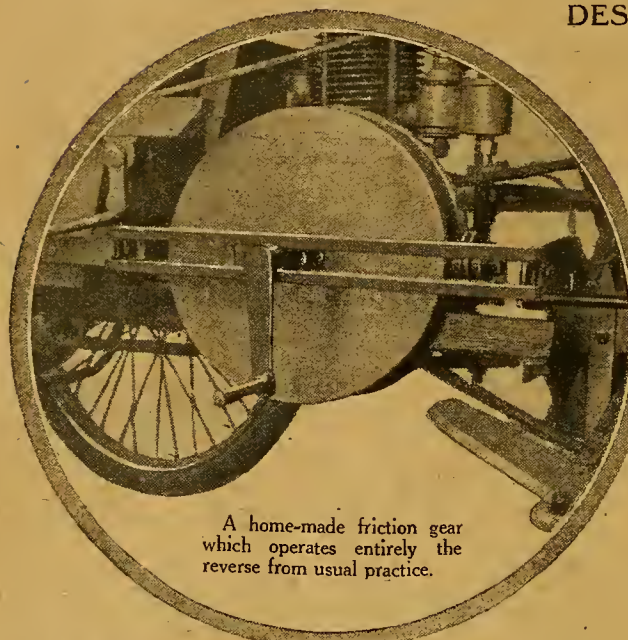
Sidcup.

F.J.W. AND F.G.

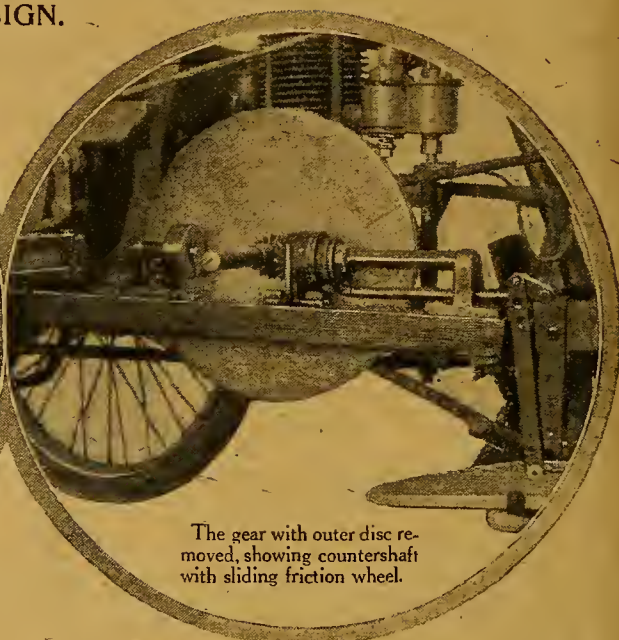


# A HOME-MADE VARIABLE GEAR.

A FRICTION DRIVE OF UNUSUAL DESIGN.



A home-made friction gear which operates entirely the reverse from usual practice.



The gear with outer disc removed, showing countershaft with sliding friction wheel.

**T**HE variable gear to be described has been fitted to an antiquated tricycle by a reader who claims that the largest tool he possesses is a carpenter's brace. The gear is unusual, and though naturally so primitive an arrangement is open to criticism, we certainly think that the inventor and maker deserves to be commended for carrying his idea into practice.

The working of the gear is as follows. On an extension of the engine shaft are two floating discs, both of which are free to revolve on the shaft. The inner disc carries the pulley or sprocket which conveys the drive to the rear wheel, while the outer disc is merely for the purpose of applying pressure to the friction wheel. This friction wheel lies between the two discs, and is mounted on a square countershaft placed at right angles to the engine shaft, but whereas in an ordinary friction drive the engine shaft disc drives the friction wheel, in this gear the state of affairs is exactly reversed.

The small countershaft wheel, driven by the engine shaft through bevels, is running always at engine speed, and, since it engages with the driving

disc, which latter is free on the engine shaft, it imparts the drive thereto—a high gear being obtained when the countershaft wheel is engaging near the centre of the large driving disc, and a lower gear as it is moved outward towards the rim of the large disc.

The outside disc, as already explained, is merely for the purpose of obtaining even pressure, thereby relieving the engine shaft and the countershaft of all side strains. The discs revolve in opposite directions, and it will be observed that on the opposite side to the countershaft is mounted a free roller to equalise the pressure on both sides of the discs. In the inside of the driving disc, between it and the engine, is placed a ball thrust, and pressure is maintained by tightly drawing up the outer disc till the small load wheel is firmly held between the two discs. The gear was made by J. F. Farris, now in France, provisional patent No. 7,965, 1917. It is operated by means of pedals, and the ratios obtainable are between 6—1 and 24—1. The pressure of the disc is instantly variable by pedal control, and a free engine can be obtained by entirely releasing the pressure.

## A Hint to Novices.

**A** TYRO recently asked me to investigate the cause of his troubles with a new machine. The first tests showed that the indubitable cause was petrol starvation. The engine started badly, would not accept extra air, ran fairly well without load on the stand or free, but could hardly be coaxed to fire at all on the road. The owner had acquired just sufficient knowledge to suspect his petrol supply, and had already proved that the feed pipe was clear, the float working properly, the carburetter slides in action, and the jet unobstructed. The explanation is very simple. The carburetter was an Amac, and, as most

readers will be aware, this vaporiser has a penthouse or metal angle plate over the jet, in which there are a number of holes, through which the petrol is sucked after it has left the jet, and so undergoes an additional mechanical vaporisation. A huge piece of fluff was tightly jammed in and across most of the penthouse holes, so that very little gas could reach the mixing chamber where the air stream joins the petrol stream. It must, of course, be a rare occurrence for enough of these holes to spoil the mixture to get blocked at the same time; but novice owners should bear the point in mind.

ROAD RIDER.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of the envelope, and should be kept distinct from questions bearing on technical subjects.

## Driving a Two-stroke.

**Q.** (1.) I have a 2½ h.p. two-speed two-stroke motor cycle. When ascending hills, is it correct to change from low to top gear without raising the compression lever? (2.) Does it injure the engine to carry a passenger on the carrier?—D.E.H.

(1.) When changing up, that is from a low to a high gear, the decompressor should be operated. When changing down it is unnecessary to do so unless the gears are found to stick under load. (2.) If the carrier is strong enough to bear the weight of a passenger, and the engine is powerful enough to climb hills with a passenger on the carrier, then there is no harm in using the machine for this purpose, but the average two-stroke is a lightweight machine intended only for solo riding.

## Engine Starved.

**Q.** I have a 5.6 h.p. Peugeot motor cycle, and could you please advise me on the following? (1.) It will not take much air through the carburetter, which is a B. and B. (2.) When going on the road it will not throttle down slowly enough, and is dangerous in traffic. As regards No. 1 question, I have bound round the induction joints with asbestos and insulation tape, so cannot see where there are any air leaks.—R.S.

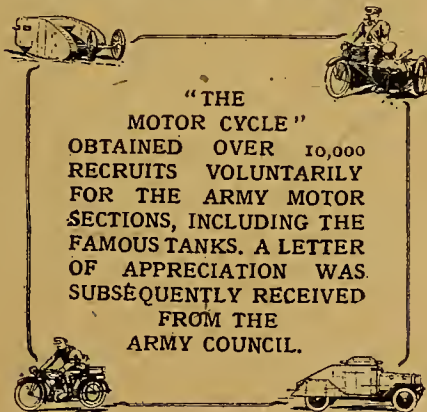
(1.) Your trouble is due either to too small a jet or to air leaks by the carburetter pistons, or valve guides. (2.) You cannot get the engine to run really slowly with automatic inlet valves unless the valve springs are too weak for efficient running at speed.

## Lack of Power.

**Q.** I have a 2½ h.p. 1912 Calthorpe Junior Precision engine. The valves have just been ground and there is good compression. It starts easily in low gear, but when put into high gear the engine stops if on the least gradient. (1.) The petrol, instead of all going into the engine, seems to blow back through the air inlet. What is the cause of this? (2.) How should this machine be timed? I cannot retard or advance spark when once fixed. (3.) There seems to be a general lack of power, yet the compression is good. (4.) I have a No. 33 jet and B. and B. carburetter. Is this too big? (5.) When I open the throttle

the engine seems to choke, and I can give it plenty of air. Is there enough petrol getting in?—G.T.

(1.) The trouble is probably due to too weak an inlet valve spring. (2.) We should recommend you to time the engine in the following manner: Place the piston 7 mm. below the top of the compression stroke, and connect up the magneto with the points just about to break. The valves should be timed as follows: Set the exhaust valve to close just after the completion of the exhaust stroke. It will then commence to open when the piston is about one-seventh of the length of the stroke from the bottom of the firing stroke. The inlet should commence to open as the exhaust closes, and remain open for one complete stroke of the piston, or while the flywheels turn through 180°. (3.) If you fit a stronger valve spring the power should improve. (4.) The jet is too large; try No. 29. (5.) The jet being too large, causes the engine to behave in the manner described.



"THE  
MOTOR CYCLE"  
OBTAINED OVER 10,000  
RECRUITS VOLUNTARILY  
FOR THE ARMY MOTOR  
SECTIONS, INCLUDING THE  
FAMOUS TANKS. A LETTER  
OF APPRECIATION WAS  
SUBSEQUENTLY RECEIVED  
FROM THE  
ARMY COUNCIL.

## A Two-stroke Defect.

**Q.** In May, 1916, I purchased a 1916 model two-speed free engine two-stroke, advertised in your columns. I did not see the machine before purchase, but a friend assured me it was all in order. During the summer and autumn its behaviour was uniformly unsatisfactory. It was in continual need of minor repairs and adjustments; neither the local garage people nor my friends could tune it satisfactorily. Towards the end of the year I broke the gudgeon pin, and left the cycle at a garage in Carnforth for repair. The people there informed me that the cylinder was scored, and would need

rebores. This they got done for me and the necessary new piston, and returned the cycle to me early this year. I was surprised and delighted with the difference, and should hardly have believed it was the same machine. Through the spring it served me well on short business journeys and to and from my work. At the end of April I made a long run, and all went well till I was nearly home, when it began to lose power and blow back through the carburetter (Senspray carburetter, Dixie magneto). Examination showed that all the holding-down bolts were slack, and also the carburetter bolt. I remade the carburetter joints and stopped the blowing back, but did not cure the loss of power. I have carefully remade the cylinder crank case joint twice, trying first brown paper and seccotine, then brown paper and oil, and believe it is tight. I have ground in the release valve and remade the joint between it and the cylinder. I have cleaned cylinder and piston top; the rings are free, so I did not remove them. Still no power. I then took the cycle to the garage at Carnforth, where I had already been served so successfully. The people cleaned the magneto points and put in a new plug, which effected a slight improvement. They admitted that the running was faulty, but they could not trace the cause—timing correct, spark good, carburetter in order, cylinder joints tight, draining plug to crank case tight. I am running on No. 2 petrol and Vacuum A oil. Last year I got 80 m.p.g., now about half that. The engine starts easily, compression is satisfactory but no power, four-strokes at slow and medium throttle openings, and occasionally misses fire; the drive is snatchy, but occasionally it two-strokes for a short burst with apparently plenty of power.—J.H.C.

Are you sure the piston has been replaced right way round? The wide sweep should be towards the exhaust port. Test the crank case joints and all other joints by running the machine on the stand and dripping oil on the suspected joints, noting if it is drawn in or blown aside. Having assured yourself that there is no leakage anywhere, test the carburetter slides for wear and slackness. If these are badly worn the strength of the mixture will vary constantly, and you will never obtain proper running. Fit new piston rings, and if these tests fail the trouble is probably in the magneto.



### Difficulty in Starting.

**?** I have a 1914 6 h.p. twin, and I have always had the greatest difficulty in starting with the kick starter, even when the machine was quite new. I have frequently kicked twenty times before the engine has fired. I have fitted two new Lodge plugs, and also had the engine cleaned. I have fitted new wires from the magneto to the plugs, and the magneto gives a splendid spark. I generally inject into both cylinders, but that does not make any difference. The most singular part about it is that if I run the machine off it will start up in the distance of three or four yards, but, of course, it is not always convenient to do that. I should be greatly obliged if you would give me your opinion on this.—G.S.

The difficulty about which you complain is not easy to solve. It looks very much as if three or four of the first teeth on the quadrant of the kick starter, which engages with the ratchet-wheel, have been broken off, with the result that you are not obtaining the full range of movement on the kick starter. Are you sure that no air leaks past the carburetter and induction pipe unions? These might well cause the trouble of which you are complaining. Again, flooding and injecting may cause too rich a mixture, and it is generally advisable to try starting up on a very small throttle opening.

### Hot Crank Case.

**?** I have a  $3\frac{1}{2}$  h.p. Sunbeam combination, and there are one or two things about the machine upon which I would like your advice. After a run of thirty or forty miles the crank case appears to be rather warm. I would not say it was hot, as sometimes I can keep my hand on it, but still I am of opinion it should not be quite so warm. The cylinder appears right in this respect: there does not seem to be overheating here. I use a 32 jet with Amac carburetter, and my usual speed is nineteen to twenty-two miles an hour. The engine and crank case have been cleaned lately, and I always, if anything, overoil. The compression is good so far as standing on the kick starter as a test goes. The heating of the crank case did not appear to take place in the winter time, but my runs then were comparatively short. What is the best method of taking off the piston rings? Would a little graphite behind the rings be helpful in preventing probable sticking? Should the rings be taken off and the grooves cleaned every time the engine is cleaned? This was not done the last time, but they were quite "free."—G.P.

We do not think that there is anything seriously wrong with your machine merely because the crank case gets warm. This it would do through conduction. An exceedingly hot crank case would mean that gas was working its way past the piston rings. Possibly during this warm weather you could use a smaller jet, when there would be less risk of overheating and better petrol

consumption. When the piston rings become badly carbonised they stick in the piston grooves, and are exceedingly difficult to remove. Many of the accessory dealers sell a special tool for expanding the rings, the points of which you can insert between the slots and gradually force them apart. A little graphite behind the rings might help matters, but when the rings stick it is nearly always a sign that the engine has been overheated or underoiled at some time. No, do not touch the piston rings unless they are actually stuck in their grooves.

### Pre-ignition.

**?** Being a regular reader of your valuable journal, I am writing for your advice concerning my motor cycle. The engine in question is a  $3\frac{1}{2}$  h.p. single with detachable valve pockets, and the trouble overheating. Everything is in order as far as I know. I have had the engine down, cleaned all carbon away from piston head and inside cylinder, made new exhaust pipe and silencer, reduced petrol jet so that when air and throttle levers are opened together it seems to be the right mixture. I have had valves correctly set, and magneto set to spark 6 mm. from top of compression stroke when lever is fully retarded.—J.S.

Your magneto is too far advanced, probably causing pre-ignition. With lever fully advanced, the points should be just breaking with the piston 9 mm. from top of compression stroke. There are many causes of overheating, which may be briefly tabulated as follow: (1.) Unsuitable or insufficient lubrication. (2.) Too weak or too heavy a mixture owing to wrong size of jet. (3.) Bad driving; running with insufficient air, or ignition too far retarded. (4.) Bad cylinder design; insufficient radiating surface. (5.) Pitted valves, slack piston rings, warped cylinder. (6.) Leakage somewhere in the combustion head.

### Indian Tips.

**?** Will you be kind enough to answer the following questions? (1.) To remove the front wheel of my 1915 road racer 7-9 h.p. Indian, do I simply have to withdraw the spindle from the hub? (2.) Can I purchase a really reliable two or three-speed gear that can be adapted to this machine without structural alteration to the frame, etc.? If so, please give the maker's name. (3.) Does the oil level on this motor cycle regulate itself and overflow excess? No matter how much I pump in on a run it is always at correct level at completion of run. (4.) What was the petrol allowance and distance run in the last T.T. race held for heavyweights? Also state average speed of winners. (5.) Is 70 m.p.g. good or just normal for this horse-power (7-9), running at an average of  $32\frac{1}{2}$  m.p.h. over a 120 mile run?—F.R.H.

(1.) All you have to do is to undo the nuts and withdraw the spindle from the hub. (2.) We do not know of any gear which can be readily fitted to this machine without structural alterations. Gears are very difficult to procure at the present time, and it is hard to find any-

one who would undertake to fit one. (3.) The oil level does not regulate itself. There is no automatic overflow, so if you pump in an excessive quantity of oil you will get smoking and excessive carbonisation. The pump itself is fixed to deliver a certain quantity of oil from the reserve tank, so maintaining a constant level. The hand pump is only to be used when you feel that the engine is short of oil or in a hilly country. (4.) There was no special petrol allowance in the last T.T. race. (In 1908 the allowance for a single was 100 m.p.g., for a twin 80 m.p.g.) The distance run was 225 miles, the course being  $37\frac{1}{2}$  miles long. The average speed of the winner was 49.49 m.p.h. (5.) Seventy miles to the gallon for this machine is quite good.

### READER'S REPLY.

#### Unsatisfactory Running.

With reference to "A.K.M.'s" query in your issue of August 2nd, page 121, I think perhaps I might be able to help him with a suggestion. Some time ago I was annoyed with the same thing happening to a fairly fast long stroke single-cylinder I had. The engine would pull quite well on the level, but on opening the throttle it would misfire, splutter in the silencer, and generally make a beast of itself until the engine stopped. That this stoppage was due to pre-ignition of sorts there is not the slightest doubt, for several times I deliberately let the engine knock itself out in order to see what happened. The last few strokes of the engine were in every case pre-ignition and back-firing to a terrible degree. Of course, I suspected either (a) heated plug, (b) portion of cylinder getting incandescent, or (c) carbon particle. I thoroughly cleaned the cylinder, looked in vain for a rough edge of metal, and fitted a Lodge racing plug. Result: No difference. I have looked through several books on motor cycling, etc., and have never yet seen an explanation of this somewhat rare (thank heaven!) occurrence. I cannot explain why it happened, but the cause of the trouble was that the condenser in the magneto was broken, therefore the points of the magneto became burnt out in no time, and on opening the throttle the spark appeared when and how it pleased. Sometimes it would appear when the piston was half up compression stroke, hence the terrible knock. When the magneto had been overhauled this trouble disappeared, and I would no longer stop on a small hill while someone on a baby two-stroke rattled past me, which, of course, as I was intensely proud of my machine, gave me the pip.—H. W. WILLIAMSON, LT., M.G.C.

### RECOMMENDED ROUTES.

HARROGATE TO RUNSWICK BAY.—SEASIDE. Harrogate, Ripon, Thirsk, Tontine Inn, Stokesley, Comondale Moor, Runswick.

LEICESTER TO ST. ANNE'S-ON-SEA.—H.P. Leicester, Asirby-de-la-Zouch, Burton-on-Trent, Tutbury, Uttoxeter, Chaddle, Leek, Congleton, Holmes Chaple, Northwich, Warrington, Newton, Wigan, Preston, Lytham, St. Anne's. Approximately 135 miles.





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Telegrams—"Hendian, Ennsroad, London."

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109-113, Russell Street, Melbourne.

**CANADIAN WORKS—**

12-14, Mercer Street, Toronto.

**Indian**

**AFRICA—**

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Indian House, 579, West Street, Durban.

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Whatever fuel you run on,

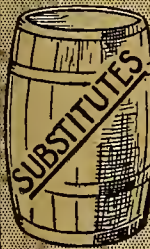
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'CASTROL'  
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The Wakefield Oil Test with  
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72, St. Vincent Street.



*In answering these advertisements it is desirable to mention "The Motor Cycle."*



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd., and crossed**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**A** BINGDON King Dick, 3 1/2 h.p., countershaft gears, and sidcar, bought new 28th July, driven 20 miles only; best offer.—Thompson, Potato Merchant, Ipswich. [6368]

### A.J.S.

**A** J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

**19** 16 A.J.S., 2 1/2 h.p., 3 speeds, kick starter, clutch, Lucas lamps, Cover, excellent condition; any examination; £45.—24, Eastdown Park, S.E.13. [6358]

**19** 16 A.J.S., 4 h.p., 3 speeds, clutch, kick starter, Miller lamp outfit, Klaxon, good tyres, petrol, oil; £65, or nearest.—Lieut. Clarke, Backbridge Park Hotel, Backbridge, Surrey. 653 Sutton. [6474]

**A** J.S., 1915, 2 1/2 h.p., 3-speed, clutch, T.T. bars, P. and H. head lamp, generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.I. [4203]

**A** J.S. Combination, 6 h.p. twin, had but little and careful usage, speedometer, hood and screen, side curtain, Lucas dynamo lighting set, electric horn, all in perfect condition; £105.—Percy and Co., 337, Euston Rd., London. [6366]

**A** J.S. 1914 6 h.p. Gloria Combination, hood, screen, speedometer, best Lucas accessories, petrol and luggage grid, tool chest at rear of sidcar, a glorious outfit; £75.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6302]

# VANS

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EVANS offers terms of payment to specially suit you, too.

Controlling Birmingham Agent for  
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CONNAUGHT, CALTHORPE.**

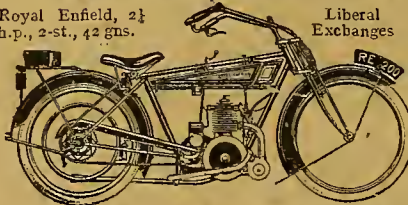
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NEW IMPERIAL, Lady's	£50 8
ROVER, 3 1/2 h.p., T.T. Philipson	£62 17 6
ROVER, 3 1/2 h.p., T.T. racer	£57 10
ROVER, 3 1/2 h.p., c'ntr'sh'ft, 3-sp	£73 10
ROVER, 3 1/2 h.p., 3-sp. Comb.	£94 10
CALTHORPE-J.A.P., 2-speed	£39 18
CALTHORPE, Lady's, 2-speed	£37 16

Royal Enfield, 2 1/2 h.p., 2-st., 42 gns.

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**TYRES.**

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Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### Alldays.

**C**OLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796]

**A**LLDAYS Allon, 2-stroke, 2-speed, new, just come from works; £40.—Sanders, 59, Bridge St., Castleford. [X3461]

**N**O Reasonable Offer Refused.—1916 Alldays Allon, 2-stroke, 2-speed; call after 5 p.m.—Broom, 77, Marylebone Lane, Oxford St., W. [6525]

**A**LLDAYS Allon, 2 1/2 h.p., 1917, 2-stroke, 2-speed, and clutch countershaft; £45.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6509]

**A**LLDAYS Matchless 3 1/2 h.p. Combination, 3 speeds, countershaft, chain driven; speedometer, in nice order; £35.—Percy and Co., 337, Euston Rd., London. [6638]

**A**LLON, 1915, 2-speed, 2-stroke, pao saddle, £39/10; single speed (new), £36; 2-speed, new, £42; 2-speed and hand clutch, new, £45; extended payments or exchange.—Service Co., 292, High Holborn. [X3771]

**A**LLDAYS Allon 2 1/2 h.p. 2-stroke Motor Cycle, the stouthearted lightweight, single speed, 2-speed, and clutch models in stock; extended payments arranged.—Harrods New Motor Showrooms, 118, Brompton Rd., London, S.W.1. [6618]

### Ariel.

**A**RIEL, 3 1/2 h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562]

**C**OLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797]

**A**RIEL, 1914, with Millford sidcar, 3 1/2 h.p., 2-speed, decompressor, Bosch, B. and B. Jones speedometer, 3 lamps with generators, spares, in perfect condition; £35, or nearest offer.—20, Marlban Rd., Stoke Newington, N. [6441]

**A**RIEL, 1915, 3-speed, and clutch, 5-6 h.p., spring seat-pillar, Dunlop tyres, hood and screen, Lucas lamp and Cowey speedometer; £71/15; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3773]

**A**RIELS.—Several new 3 1/2 h.p. 3-speed countershaft models actually in stock; clutch and kick starter, special spring seat-pillar, patent decompressor, etc., etc.; prices and terms on application.—Harrods New Motor Showrooms, 118, Brompton Rd., London, S.W.1. [6621]

### Auto-Wheels.

**19** 14 Auto-Wheel, very little used; £7/15, close offer.—Bertram, Gorebridge, Scotland. [X3726]

**W**ALL Auto-Wheel, just overhauled; bargain, 25.—Rumbrey, The Chestnuts, Norton, Malton, Yorks. [X3658]

**A**UTO-WHEEL, excellent condition, overhauled and July, with 2 1/2 gallons petrol; £6.—Roberts, 41, Hestercombe Av., Fulham. [6432]

**A**UTO-WHEEL, run about 500 miles, £8/10; another, £7/10; two gent's Raleigh cycles for same, £4/10 each.—21, Station Rd., Forest Gate, London, E. [6452]

**A**UTO-WHEEL, 1914, good running condition, nearly new Palmer tyre, price £6/10; with cycle if preferred, £8/10; splendid offer.—F. Putnam, Hazlemere, High Wycombe. [6542]

**C**HATER-LEA Lady-back Tandem, 21-24, 3-speed, with standard Auto-Wheel, just arrived; price on application.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6306]

### Bradbury.

**19** 11 4 h.p. Bradbury 2-speed Combination, good running order; £25.—53, Brownhill Rd., Catford. [6595]



## MOTOR CYCLES FOR SALE.

## Bradbury.

4 h.p. Bradbury, 1913, splendid condition, £20; metal racing sidecar, £4/15.—35, Mowbray Rd., Brondesbury. [6523]

BRADBURY, 4h.p., 1914, coach combination, 3-speed, kick start, lamps and speedometer; £35, or exchange.—F.M., 22, Vale Rd., Finchbury Park. [6627]

## Brough.

BROUGH, 3½h.p., 1915, horizontal twin, painted grey, all accessories; £45.—Wertner, Tonbridge. [6521]

BRAND New 1917 Brough, 3½h.p., horizontal twin, 3-speed countershaft, lady's model, just delivered; suit lady or gent; £65.—Miss Reid, 171, Vernon Rd., Basford, Nottingham. [X3655]

## Brown.

BROWN, 3½h.p.; £12/10.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6506]

## B.S.A.

B.S.A., 4½h.p., brand new, actually in stock.

B.S.A. 4½h.p. 1915 Combination, indistinguishable from new; £60.—Percy and Co., 337, Euston Rd., London. [6639]

COLMORE Depots 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798]

IF You Want a B.S.A., write us for motor cycle list.—Walbro Motor Co., Ely, Cambs. [X3754]

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888]

B.S.A., 1914, semi T.T., in good running order; bargain, 25 gas.—441, Brighton Rd., South Croydon. [6495]

NEW 1917 B.S.A., 4½h.p., Model K, the last one left.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481]

B.S.A. 1916 Combination, almost new, and all spares; write for particulars; price £68.—Turner, 21, Welsh Rd., Queensberry, near Chester. [6576]

NO Reasonable Offer Refused.—Late 1913 B.S.A., 2-speed, equivalent to kick starter, new tyres, with or without sidecar; call after 5 p.m.—Broom, 77, Marylebone Lane, Oxford St., W. [6524]

B.S.A., 1916, Lucas lamps, mechanical horn, 500 miles, fitted Phoenix sidecar chassis and Enfield O.B. body, excellent combination; worth £70, take £65.—Williams, B.V.C., Parsons Green Lane, S.W. [6490]

B.S.A. 4½h.p. 1917 C.B. Combination, 3-speed countershaft, kick starter, Lucas lamps, generators, horn, chain driven, ridea 100 only; cost £84, accept £73, bargain.—Smith, Charlton Villa, Staines Rd., Bedford, Middlesex. [6455]

1916 B.S.A., chain-belt, 3-speed countershaft gear, 4½h.p., suitable for sidecar work; price only 46 gas.; undoubtedly the cheapest B.S.A. in England to-day.—Julius, 84, Broad St., Reading. Biggest light car and motor cycle dealer in the South. Phone: 1024. [0916]

## Calthorpe.

IF You Want a Calthorpe, write us for motor cycle list.—Walbro Motor Co., Ely, Cambs. [X3755]

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

1916 Calthorpe, 2-stroke, excellent condition; 21 gas, bargain.—436, Whitehorse Rd., Tottenham Heath. [6492]

1916 2½h.p. 2-speed Calthorpe-Jap, in splendid condition, lamp, etc.; £30.—Simister, Jordnagate, Macclesfield. [X3716]

CALTHORPE-J.A.P., 1916, 2½h.p., Enfield 2-speed; owner called up.—Chapman, Glewosa, Honey Lane, Waltham Abbey. [6377]

CALTHORPE-J.A.P. Lightweight, 2½h.p., Enfield countershaft 2-speed gear.—Motor Exchange, Horton St., Halifax. [6585]

CALTHORPE, 1917, J.A.P., latest model, brand new, Enfield 2-speed, in stock; 38 gas.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6464]

CALTHORPE-J.A.P., 2½h.p., late 1915, Enfield 2-speed gear, lamps, splendid condition; £27.—Apply after 8 p.m., 5, Trilock Rd., Tottenham, N.17. [6572]

CALTHORPE, 1917, 2-stroke, Enfield 2-speed, latest model; 35 gas., brand new, in stock.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6465]

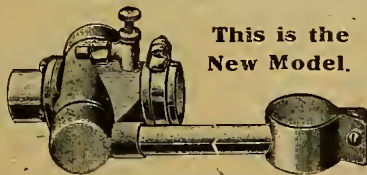
CALTHORPE, 2-stroke, Enfield 2-speed, new, but slightly shop-soiled; special bargain, 30 gas.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6466]

2½h.p. Calthorpe, 2-stroke, Enfield 2-speed gear, perfect condition throughout; 20 gas.—Parker, 11, Claricarde Gardens, Notting Hill Gate, London, W. [6403]

CALTHORPE-J.A.P., 1915, 2-speed, 2½h.p., only used 6 months, owner at sea, £28/10; also three brand new 1917 models actually in stock.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6304]

## The "GRADO" Paraffin Vaporiser.

Motor Cyclists! Here is a device which will enable you to run on paraffin and get results equal to petrol. It is designed by a practical engineer and has been well tested. It fits between the engine and carburettor, and is connected to the silencer pipe by the clip illustrated. An injection of petrol through the tap on top starts your engine. Paraffin then does the work.



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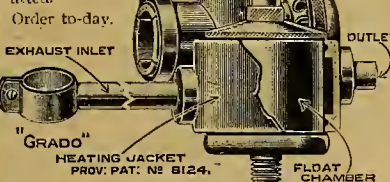
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## MOTOR CYCLES FOR SALE:

## Campion.

4 h.p. Campion, 3 speeds, and coachbuilt sidecar, with back seat; £37, or would exchange level for higher power.—50, Tivoli Rd., West Norwood, S.E.27. [6513]

## Chater-Lea.

1916 7-9h.p. Chater-Lea Combination, complete with all accessories, does very little running; £85.—Missia, Cottingham, Hull. [X3894]

## Clyno.

CLYNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham and Manchester; inclusive price with spare wheel, 100 gas. [0884]

1915 6h.p. Clyno Combination, detachable wheels, Binks carburettor, magnificient turnout; £65, or expert examination; sacrifice.—Else, Dimple, Matlock. [X3718]

5-6h.p. Clyno, with Gloria Projectile £30 sidecar, very luxurious outfit, quite complete, and in nice condition; best offer over £35.—Williams, 6, Pitville Parade, Cheltenham. [X3651]

## Connaught.

CONNAUGHT Miniature, single speed, £33/17/6; ditto, 2-speed, £41/6/6; standard 2-speed, £44/9; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3779]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new; 42 gas.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3777]

## Dene.

DENE-PRECISION, 3½h.p., 3-speed, clutch, kick starter; £30; demonstrate.—Grimes, Worsbrough, Barnsley. [X3591]

## Douglas.

1914 Douglas, 2 speeds, free engine, complete; £36.—Cross, Eppingham Sq., Rotherham. [X3791]

IF You Want a Douglas, write us for motor cycle list.—Walbro Motor Co., Ely, Cambs. [X3727]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, 1914, 2-speed; £23.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6500]

1915 4h.p. Douglas Combination, lamps, horn, in very good condition throughout; £70.—Below.

1915 2½h.p. 3-speed Douglas, lamps, horn, etc., as new; £50.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0492]

1915 2½h.p. Colonial Model, 3-speed, T.T. Douglas, perfect condition; £45.—Chambers, Haxby, York. [X3793]

DOUGLAS, 1914, 2-speed, Phillips pulley; £45.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6501]

DOUGLAS, 1913-14, 2-speed, new tyres, internally as new; genuine bargain, £27.—243, Drakefell Rd., Brockley. [6532]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil, Tel. 50. [6585]

DOUGLAS, 1911, 1912, 1913, 1914, 1915, and 1916 models in stock; all prices.—Percy and Co., 337, Euston Rd., London. [6634]

COLMORE Depots Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800]

DOUGLAS, 1913, 2-speed, Bosch mag.; £35/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3767]

1913 Douglas, 2-speed clutch model, kick starter, engine and gears overhauled; £32.—Kelvey, 194, Oxford Rd., Manchester. [X3787]

1914 2½h.p. 2-speed T.T. Douglas and accessories, in good condition; £33/10.—Seen Bounds Garage, 223, High Rd., Kilburn. [6563]

DOUGLAS, 1915, kick starter, 2 speeds, hardly used, must dispose; £42.—Write only, 51, Maplethorpe Rd., Thornton Heath, S.E. [6374]

DOUGLAS, 1915, 2½h.p., 1916 cylinders, 3-speed, lamps, etc., first-class condition; 47 gas.—Gibb, Douglas Expert, Gloucester. [X3793]

DOUGLAS, 2½h.p., 2 speeds, T.T. model, spare tank, Binks, fully equipped, condition nearly equal to new; 38 gas.—Albert Deans, Baldoek. [6575]

1912-13 2½h.p. 2-speed Douglas, new spare tyre, long exhaust, new winter mudguards, starts pull of wheel, very fast; £25/10.—43, Bryan Rd., Blackpool. [X3593]

DOUGLAS, 1914, 2-speed, long nickel exhaust pipe, Lucas lamp set, Klaxon, footboards, spare belt and chain in case; £38.—Palmer, 61, Commercial Rd., S.E.1. [6572]

1916 Douglas, 2-speed, full spares and tools, used only fine weather as tender to car, a splendid machine; 40 gas.; wanting sidecar machine.—Hynes, Lismore, Ireland. [X3659]

DOUGLAS, 2½h.p., 3-speed, not earlier than 1915, mechanical condition perfect; cash or 2½h.p. All days Matchless 2-stroke part exchange.—Robinson, 39, Norfolk St., Sheffield. [X3762]

DOUGLAS, 1914, 4h.p., 2 speeds, kick start, Binks Bosch, unused last 14 months, ideal solo or sidecar machine, new condition; £46, lowest.—28, Mitchenhall Rd., Tooting Broadway. [6557]



## MOTOR CYCLES FOR SALE.

## Douglas.

**DOUGLAS**, late 1913, countershaft model, 2-speed, free engine, kick start, Bosch mag., auto. lubricating, speedometer, lamps, etc.; tyres excellent. £30, lowest; see by appointment.—20, Thorbury Av., Osterley Park. [6383]

**DOUGLAS**, 1914, 2-speed, P.H. lamps, horn, spare chain, new tyres and tubes, spares, all accessories; 100 miles trial; guaranteed perfect; bargain, £36; will exchange with cash for Morgan.—Read, 1, Hare St., Bethnal Green. [6529]

23 h.p. Douglas, absolutely new; immediate delivery of models U, V, W, clutch, kick start, against priority permits, for doctors, farmers, war and munition workers, etc. How and where to apply.—For full particulars write to the Douglas Specialists, Robinson's Garage, Greco St., Cambridge. Tel.: 388. T.A.: Bicycles. [6563]

## Enfield.

**ENFIELD** Combinations, latest models; £94/10; delivery from stock.—Below.

**ENFIELD** 3 h.p. Twin; £57/10; and 2 1/2 h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838]

**COLMORE** Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801]

If You Want a Enfield, write us for motor cycle list.—Walbro Motor Co., Ely, Cambs. [X3752]

**1914** 6 h.p. Enfield Combination, excellent condition; any trial: £65.—Reynolds, 2, Prospect Rd., Tunbridge Wells. [6370]

**ENFIELD** Combination, 1916, 6 h.p., 3 electric lamps, horn; £86; call any time.—94, Hoppers Rd., Winchmore Hill, N.21. [6577]

**ENFIELD**, 1917, 3 h.p.; 55 gns.; brand new, in stock, immediate delivery.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6463]

**ENFIELD** 3 h.p. Twin, 2-speed, kick start, lamps, tools, 1,000 miles, nearly new; £45, or near offer.—14, Chippy St., New Cross, S.E.14. [6578]

**ROYAL** Enfield, 2 1/2 h.p. twin Motosacoche engine, Bosch mag., chain drive; £15, or near offer.—T.H., Ridgmount, Farnborough, Hants. [X3652]

**ENFIELD**, late 1912, 2 1/2 h.p. M.A.G. twin, 2 speeds, P.E. Bosch, footboards, splendid condition; £20; after 7.30.—28a, McLeod Rd., Plumstead. [X3760]

**ENFIELD**, late 1916, 3 h.p., 2-speed, unscratched, and equal to new; great bargain, £45.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [6555]

**1914** 2 1/2 h.p. Enfield, 2 speeds, footboards; 1916 Sun, 2-stroke, countershaft gear; £50; sell or exchange powerful combination.—Latham, Railway Row, Mexborough, Rotherham. [X3785]

**ENFIELD** Combination, 6 h.p., 1916, hood, wind screen, speedometer, accumulator lighting, Klaxon, tools, etc., excellent condition; £84, or nearest offer.—125, Rochdale Rd., Plumstead, S.E.18. [6457]

**ENFIELD** 6 h.p. Coachbuilt Combination, 1913, electric and acetylene lighting, oversize tyres, speedometer, and numerous spares, petrol, etc. £44.—2, Braishot Cottages, Cove Rd., Fleet, Hants. [6358]

3 h.p. Enfield Combination, 2-speed, 1916, kick start, coachbuilt Watsonian featherweight sidecar, lamps, Stewart speedometer, Klaxon, Palmers, absolutely perfect; 50 gns. Box L4,240, c/o The Motor Cycle. [6579]

**1913-14** 6 h.p. Enfield Combination, C.B. sidecar, in very good condition, all chains new, fast and absolutely reliable machine, 6 gallons petrol; trial given; 50 gns., or close offer.—Whale, Bacombe Warren, Wendover, Bucks. [6422]

**ROYAL** Enfield, 3 h.p., twin-cyl., brand new; cost £57/15, invoice will be produced; too heavy for owner, an elderly gentleman; price £56, or will take in part exchange a late Douglas, 2 1/2 h.p.—Mr. Lawford, Padworth House, Raynham Rd., Maidenhead, Berks. [6477]

**FOR** Disposal, 5-6 h.p. Royal Enfield combination, 1916-17, J.A.P. engine, 2-speed, free engine, Palmer corded tyres, hood and screen, everything in perfect condition; seen any time; price £80, or would exchange with a little cash for a first-class make 2-seater car.—Apply, Subert, 69, Manor Rd., Stoke Newington. [6475]

**ENFIELD**.—Actually here, brand new 1917 Enfield 6 h.p. outfit; also 1917 2 1/2 h.p. 2-speed 2-stroke, £44/2; also 1916 early standard combination, at £80; also 1916 6 h.p. combination, indistinguishable from new, £98/10; also 1916 dynamo lighting model, hood and screen, £11/0; 1917 3 h.p. T.T. model and spring sidecar, heap accessories, £68/10; also another 6 h.p. combination, with all accessories, and family sidecar, £48/10; exchanges, easy payments by arrangement.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6298]

## Excelsior.

**EXCELSIOR** 1917 Combination, the most luxurious in London, electric dynamo lighting, 3 speeds, mileage 200; best offer.—Witte, 51, Maplethorpe Rd., Thornton Heath, S.E. [6375]

**EXCELSIORS**.—All models in stock; magneto model £75, electric lighting model £85; get a big X. You'll be satisfied.—Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester. [X1462]



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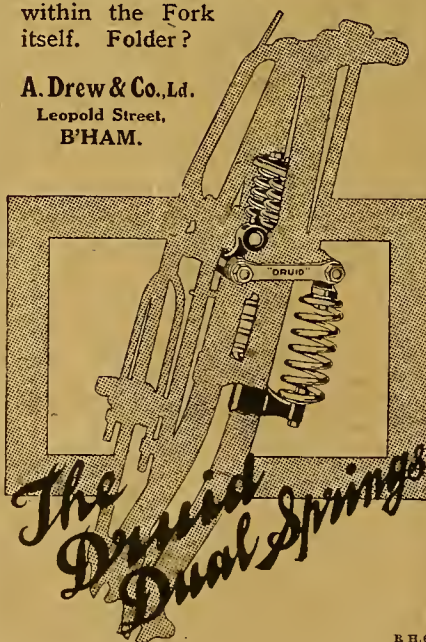
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This Fork alone ensures perfect handle-bar comfort because The DRUID Dual Springs it embodies alone entirely neutralize all vertical and horizontal shocks within the Fork itself. Folder?

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## MOTOR CYCLES FOR SALE.

## F.N.

4-CYL. F.N. Motor Cycle, a.v.v., dismantling; spares for sale.—Eele, High St., Thame. [X3800]

**1914** F.N., 6 h.p., 4-cyl., 2-speed, clutch, K start, perfect order, £50; Premier lightweight, £16.—Pence, Woodmancote, Chichester. [6442]

**F.N.**, 1914, 5-6 h.p., 4-cyl., 2-speed, clutch, kick starter, speedometer, tools, etc.; £30; exchanges.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube. [6363]

## Harley-Davidson.

**HARLEY-DAVIDSON**, 7-9 h.p., 1915, brand new, electric, 3 speeds; offers wanted.—R. Wootton, Longford, Coventry. [X3604]

**HARLEY**, 1915, 20 go. Canelet, 2,000 miles only; £65, faultless.—17, Tamworth Park, Commonsides East, Mitcham. [6459]

**COLMORE** Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802]

**1916** Harley-Davidson Combination, electric model, in perfect condition; £92/10.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491]

**HARLEY-DAVIDSON** Combination, 1915, electric equipment, in exceptional nice condition; £65.—Percy and Co., 337, Euston Rd., London. [6635]

**HARLEY-DAVIDSON** Combination, 1916, fully equipped, and thoroughly overhauled; great snip, £85.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [6556]

**HARLEY-DAVIDSON**, a 1915 beautiful combination, with 3 lamps, horn, and many spares, condition perfect; £25.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6299]

**1916** Harley-Davidson and Sidecar for sale, Bosch mag., Palmer cord tyres, done about 8,000 miles; £85, or near offer; will consider exchange for light car.—Apply, Cook, 38, Blandford St., Baker St., W.1. [6444]

**HARLEY-DAVIDSON**, 7-9 h.p., late 1915, and coach sidecar, complete with accessories, not done 2,000 miles, recently overhauled, good condition; price £63.—Richens, East Hanningfield, Chelmsford, Essex. [6534]

**HARLEY**, 1916 racing model, 7-9 h.p., single-speed, clutch, racing exhaust pipes, rubber covered footboards, T.T. handle-bars, Goodyear tyres, finished in Harley grey; this machine is an ideal sporting mount, and has had very little use; £63/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3776]

## Hazlewood.

**1915** Hazlewood-Jap, 2 1/2 h.p., 3-speed, in excellent condition; £30.—S. W. Foulds, Radcliffe-on-Trent, Notts. [X3761]

**HAZLEWOOD** 1915 Combination, 5-6 h.p. J.A.P. engine, 3-speed, clutch, and kick starter, Lucas lamps, speedometer, special sidecar; £72/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3772]

## Henderson.

**HENDERSON**, March, 1916, new, 2-speed, Montgomery luxurious coachbuilt tandem sidecar, luggage grid and petrol carrier, electric light, Tynesider bucket seat, tools and spares, mileage under 1,000, condition indistinguishable from new; £100.—Plover, 54, Dulverton Rd., Aighurth, Liverpool. [X3794]

## Humber.

**HUMBER** Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

If You Want a Humber, write us for motor cycle list.—Walbro Motor Co., Ely, Cambs. [X3750]

**HUMBER**, 3 1/2 h.p. mag., spring forks, belt drive; £14/10.—Motor Exchange, Horton St., Halifax. [6586]

**1914** 3 1/2 h.p. 3-speed Humber, lamp, etc.; £35, cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863]

**HUMBER** 3 1/2 h.p. Combination, Roe gear, recently overhauled; £23.—Seen Scrase's Garage, 381, Battersea Park Rd., S.W. [6384]

**HUMBER**, 1912, 3 1/2 h.p. sidecar, 2 speeds, handle start, fine condition.—Hill, 13, St. John's Villas, Friern Barnet Rd., New Southgate. [6479]

**HUMBER**, late 1913, 3 1/2 h.p., 3-speed, with Milford coachbuilt sidecar, Sturtevant-Archer clutch, in good condition; owner joining up, must sell; what offers?—A. C. Gould, 32, White Lion St., E.1. [6398]

## Indian.

**INDIAN**, 1915, 7-9 h.p., T.T., free engine, in real nice condition; £40.

**INDIAN**, 5 h.p., 1915, 3 speeds, in first-class order and condition; £45.—Percy and Co., 337, Euston Rd., London. [6628]

If You Want an Indian, write us for motor cycle list.—Walbro Motor Co., Ely, Cambs. [X3751]

**1912** 4 h.p. Single-cyl. Indian, 2 speeds, free engine; £23/10.—Motor Exchange, Horton St., Halifax. [6587]

**1915** 7-9 h.p. Combination Indian, electrically equipped, speedometer, like new; £75.—Stott, Newcombe St., Elland. [6274]



## MOTOR CYCLES FOR SALE.

## Indian.

7-9h.p. T.T. Red Indian Combination, clutch model, sporting, type sidecar; £45.—126, Newington Causeway, London, S.E.1. [6489]

7-9h.p. Indian 1914 Combination, 2 speeds, spring frame, plenty spares, sound condition; £48.—15, Arklow Rd., New Cross, S.E. [6488]

1914 T.T. 2-speed Clutch Indian, and accessories, in good condition; £42; seen any time.—Bounds Garage, 223, High Rd., Kilburn. [6570]

7-9h.p. Indian and Sidecar; a real bargain, £70; this machine is faultless, a grand goer.—O. Bellamy, Park House, Wimbleson, Cambs. [6548]

INDIAN, 1915, 3 speeds, spring frame, coach combination, electric lighting, guaranteed; £62/10.—51, Maplethorpe Rd., Thornton Heath. [6557]

1914 Indian, 7-9h.p., 2 speeds, speedometer, electric horn, Rushmore head set, perfect condition; evenings; £40.—65, Union Rd., Borough, S.E.1. [6365]

1914 (late) 7-9h.p. Indian, T.T., clutch, one speed, engine overhauled, new rear chain and sprocket, new tyres; £36.—Pana, Oakthorpe Rd., Palmer's Green. [6494]

1916 6h.p. Indian, T.T. model, 3-speed, clutch, kick starter, Lucas lamps and mechanical horn, tyres hardly worn, condition quite as new; £55, no offers.—Lily Works, Sandbach, Cheshire. [X5805]

1916 7-9h.p. T.T. Indian, mileage 2,000, first-class condition, racing wicker sidecar, speedometer, horn, etc.; £55; will give purchaser 40 gallons petrol.—Box 14,239, c/o The Motor Cycle. [6580]

INDIAN 7-9h.p. Combination, rear spring, electric horn and lights, 3-speed, hand or foot clutch, only ridden 3 times, bought new June; cost £130, sell £90.—6, Clifton Rd., Prestwich, Manchester. [X5593]

INDIAN, 1915-16, 5h.p., 3-speed, kick start, perfect condition throughout, ridden approximately 2,500 miles, special mudguards, extra tank for running on paraffin mixture; £65.—7, St. John's Park, Blackheath, S.E.3. [6450]

INDIAN, 1915, 7-9h.p., spring frame, 3-speed, T.T., electric horn and lights, speedometer, all tools, many spares, nickelled cylinders, disc wheels, bought 1916, perfect condition, mileage under 2,200; any examination; £65.—Box 1,117, c/o The Motor Cycle [X5662]

BRAND New Powerful Indian, purchased April, 1917 (not done 500 miles), 3-speed, hand and foot clutch, kick start, semi T.T. bars, Corbin speedometer, Lucas lamps and horn, spare valves, sprockets, all the best, cost £85, must sell, £63; Midlands.—Box 1,124, c/o The Motor Cycle. [X5795]

INDIAN, 1915, 5h.p. model, 3-speed, kick starter, lamps, and new Indian Canelet sidecar; £68/10; also 1915 T.T. 7-9h.p. solo model, disc wheel, speedometer, lamps, and horn, condition quite as new; £55.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6301]

## Ivy.

1915 Ivy, 2-stroke, countershaft 2-speed, perfect order; £17/10.—Rose, 14, Cyprus St., Globe Rd., Old Ford, N.E. [6625]

IVY, 2-strokes, 2½h.p., 1915, good tyres, fully equipped, as new throughout; £23.—Advertiser, 156, Gt. Portland St., W.1. [3924]

## James.

1917 2-stroke James, absolutely as new, done 300 miles; £38.—Cross, Jeweller, Rotherham. [X5792]

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803]

JAMES, 1913, waterproof Bosch, chain drive, countershaft 2-speed gear, and coach sidecar, body brand new; £36/10.—Motor Exchange, Horton St., Halifax. [8591]

JAMES Combination, late 1916, 4½h.p., 3-speed, all-chain drive, magnificently equipped with Lucas dynamo lighting, absolutely a perfect outfit, equal to new; greatest bargain offered at £70.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [6557]

## J.A.P.

J.A.P., 4h.p., 2 speeds, kick starter, all chain, and sidecar; £50.—Digby, Mersea, Essex. [6367]

1914 4h.p. J.A.P., Chater 2-speed; £23, or exchange Triumph.—53, Broyhill Rd., Calford. [6396]

FOR Sale, 7h.p. J.A.P. motor cycle and coachbuilt sidecar, in sound condition and perfect running order; £25; to be seen any time Sunday or after 3.30 p.m. Saturday.—100, Third Avenue, Manor Park, E.12. [6644]

## J.H.

J.H., new, 1917, 2-stroke, 2-speed; 42 gns.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6507]

J.H., 2-speed, new; £35/14; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3778]

## Levis.

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804]



## NEW MACHINES ACTUALLY ON SHOW.

ENFIELD 1917 6 h.p. 2-sp. Outfit .....	£115 0
ENFIELD, 1917, 2½ h.p., 2-speed, 2-stroke	£44 2
ROVER, 1917, 3½ h.p., 3-speed counter-shaft Combination, with Sidecar .....	£99 4 6
JAMES, 1917, 3½ h.p. twin, 3-speed .....	£69 10
JAMES, 1917, 4½ h.p., No. 6, 3-sp. Comb.	£87 2
ARIEL, 1917, 3½ h.p., 3-sp. Combination	£93 10
LEVIS, 1917, 2½ h.p., 2-sp., Model E ...	£47 10
CALTHORPE-J.A.P., 1917, 2½ h.p., 2-sp., Enfield Sidecar .....	£39 16
CALTHORPE-J.A.P., 1917, 2½ h.p., 2-sp., with Sidecar .....	£50 0
ALLDAYS ALLON. All models from ..	£37 10
ROYAL RUBY. All models from .....	£32 10

## SECOND-HANDS.

ENFIELD 6 h.p. coach Combination, 2-sp., all accessories .....	£48 10
ENFIELD 1916 6 h.p. dynamo lighting Combination, condition very fine ..	£110 0
ENFIELD 1916 6 h.p. Combination, 3 lamps, head, Cowey speedometer ..	£84 0
ENFIELD 1916 (late), 6 h.p. Combination, 3 lamps, horn, mileage under 1,000	£98 10
ENFIELD, 1917, 3 h.p. twin, semi-T.T. model, with sporting Canelet Sidecar	£69 10
ENFIELD, 1916 .....	£80 0
MATCHLESS, 1915-16, 8B, 7 h.p. Combination, Lucas accessories .....	£95 0
HARLEY-DAVIDSON 11F Combination, bought new in 1916, fully equipped ..	£75 0
INDIAN, 1915-16, 7-9 h.p., clutch model, T.T. bars, disc wheels, with lamps, and horn, ridden approx. 1,000 miles	£55 0
INDIAN, 1915-16, 5 h.p., 3-sp. Combination with accessories, tyres unpunctured	£68 10
TRIUMPH, 1913, 3½ h.p., 3-speed, semi-T.T. bars, a nice little solo mount .....	£35 0
TRIUMPH, 1913, 3½ h.p., 3-speed Combination, with lamps, horn, and usual acc.	£48 0
TRIUMPH, 1911, 3½ h.p. model, fixed gear, semi-T.T. bars, and accessories .....	£20 0
TRIUMPH, 1914, 4 h.p., 3-speed Sturtevant Archer gear, Millford Sidecar .....	£48 10
ALLON 1916 model, 2½ h.p., single speed outfit, just overhauled by makers ..	£25 10
ALLON 1917 model, 2½ h.p., 2-speed, hand clutch, full kit tools, and Stewart warning horn, ridden 200 miles only .....	£43 0
NEW HUDSON, 1913, 3½ h.p., 3-speed Combination, with lamp, horn, etc....	£39 10

Easy Terms by arrangement. Exchanges.  
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## MOTOR CYCLES FOR SALE.

## Levis.

LEVIS 2½h.p. Popular, 1916, excellent order; £23.—G., 24, Crimscoot St., Bermondsey. [6379]

LEVIS 1917 Popular, latest model, brand new; £32.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6467]

LEVIS, 2½h.p., lamp, horn, speedometer; £17; excellent machine.—Webster, 18, De Crespigny Park, S.E.5. After 6 p.m. [6539]

LEVIS, 2½h.p., 1915, 2-stroke, head lamp, generator, rear lamp, good tyres, fully equipped; bargain, £24.—Advertiser, 156, Gt. Portland St., W. [6609]

## Matchless.

MATCHLESS Motor Cycles: no quicker delivery obtainable than from Colmore Depots. [0881]

MATCHLESS, 1913, 8h.p., and coachbuilt sidecar, 2-speed, kick start, splendid condition; £50.—60, Lime Grove, New Malden, Surrey. [X3668]

MATCHLESS, 1913, 6h.p. twin J.A.P., free engine, in real nice order and condition; £28.—Percy and Co., 337, Euston Rd., London. [6643]

MATCHLESS, 6h.p., 3 speeds, clutch, underslung C.B. sidecar, smart; £40, offer; exchange.—18, Gower Rd., Peckham. Appointment. [6623]

MATCHLESS 8h.p. Combination, 1917, 8B2 (not military model); never been ridden; what offers? 66, Howarth Rd., Plumstead, S.E.18. [6458]

MATCHLESS, 1915, hood, screen, speedometer, a most gorgeous machine, guaranteed date and condition; £82.—Write only, 51, Maplethorpe Rd., Thornton Heath, S.E. [6373]

MATCHLESS 1915-16 8B 7h.p. Combination, with heap accessories, child's seat at rear, tip-top order; £25.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6500]

MATCHLESS 1917 Combination, 8h.p., 3-speed, clutch, and kick starter, detachable wheels, including spare wheel, new; £120; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3784]

## Mancunian.

MANCUNIAN, 2½h.p., 2-speed; £35.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6502]

## Minerva.

MINERVA, 3½h.p., vertical m.o.v. engine, coil ignition; £31/5.—Motor Exchange, Horton St., Halifax. [6593]

## Moto-Reve.

MOTO-REVE Lightweight, mag., Druids, Amac, vaporiser, running on paraffin, perfect condition; £15.—Aldis, 39, Eastward Hol, Leiston, Suffolk. [6487]

## Motosacocha

3½h.p. Motosacocha, M.A.G. engine, Enfield 2-speed, 2 lamps, etc., good condition, fine solo; £28.—Joseph Pearson, Whittington, Epsom. [6514]

EXCEPTIONAL Opportunity.—Brand new 1917 Motosacocha and sidecar, 6h.p. M.A.G. engine, 2 speeds, etc.; cost £88 week ago, sacrifice £78 for spot cash; any trial or examination welcomed.—Apply, Revell, Butcher, Sheffield Rd., Chesterfield. [X3801]

## New Hudson.

NEW HUDSON 6h.p. Twin Combination, 3-speed, 1914; £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6503]

New Hudson, 1912, 2½h.p., 3-speed, clutch, fine order; £16.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube. [6364]

1915 New Hudson, 2½h.p., 2-speed, free engine, little used; owner joined up; £27/10.—T. Owen, Pool House, Hedsdesford. [X5996]

NEW Hudson 2½h.p. Lightweight, single speed, as new; £20, or exchange for combination.—F.M., 22, Vale Rd., Finsbury Park. [6626]

NEW Hudson, 2½h.p. J.A.P., 3-speed hub, clutch, excellent condition, lamps, etc., complete; £25.—R.N.A.S., 44, Dodington Grove, Battersea Park, S.W. [6386]

## New Imperial.

NEW Imperial, 1917, 2½h.p., 3½h.p., 6h.p. models, in stock.—Crown Bros., Guildford. [2563]

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805]

NEW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0839]

NEW Imperial, 1917, 2½h.p., 2-speed, in perfect condition, lamps, horn, spare belt, 120 m.p.g.; £32.—Box 14,237, c/o The Motor Cycle. [6582]

1914 New Imperial-Jap, 2½h.p., 2-speed, chain-cum-belt, tyres excellent, mechanically perfect, good as new; £24.—24, Plassy Rd., Calford, S.E. [6461]

NEW Imperial-Jap, 1915, 2-speed gear, in splendid order, with lamp and horn; trial given; £24 cash, no offers.—Hall's Garage, Ltd., Stevenage, Herts. [6415]

NEW Imperial, 2-speed, new, 39 gns. 2-speed, clutch, and kick starter, 46 gns. extended payments or exchange.—Service Co., 292, High Holborn, London. [X3782]



## MOTOR CYCLES FOR SALE.

## New Imperial.

NEW Imperial-Jap, 1917, 2½ h.p., 2-speed, extra tank, lamps not been lit, tyres unpunctured, excellent condition; £32.—Richardson, Kilm Bank, Milnrow. [X3687]

NEW Imperial-Jap, 2½ h.p., 1915, 2-speed gear box, new tyres and belt, just thoroughly overhauled and re-ennamelled; £27/10.—21, Station Rd., Forest Hill, London, E. [6451]

NEW Imperials, 1917 models, for immediate delivery, No. 1 39 gns., No. 2 46 gns.; two new 1916 models No. 1 at £38.—Colmore Depots, 211, Deansgate, and 31, Beeshaw St., Liverpool. [6886]

NEW Imperial, 2½ h.p., 2-speed, 38 gns.; actually in stock for immediate delivery; extended payments arranged.—Harrods Stores, Ltd., New Motor Showrooms, 118, Brompton Rd., London, S.W.1. [6620]

1916 New Imperial-Jap, absolutely new, never been used; first cheque for 52 gns. secures this bargain.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealer in the South. Phone: 1024. [6915]

NEW Imperial-Jap, new May, 1916, unused winter and wet weather, Brooks B170, Jones speedometer, extra tank, metal fore and undershield, P. and H. large head light, spare tube (unused), condition excellent; £30.—Motor House, Brompton, Chatham. [6409]

2½ h.p. New Imperial-Jap, late 1916, not ridden 200 miles, as new condition, E.I.O. mag., Amco carburettor, Lycett saddle, Dunlop tyres and belt, Druid forks, horn, and lighting set, absolutely as new; £31, no offers.—W. Thralfall, Beechfield, 23, Cope St., Bamsley, Yorks. [X3606]

## Norton.

NORTON Big Four, 1916, 3 speeds, combination, in real good order and condition; £65.—Percy and Co., 337, Euston Rd., London. [6640]

1914 4½ h.p. 3-speed Norton and Gloria sidecar, with lamps, speedometer, horn, etc., in splendid condition; £56.—Simister, Jordangate, Macclesfield. [X3715]

## N.S.U.

1914 Rear Sprung 6½ h.p. N.S.U., 2 speeds, coach-built sidecar, lamps, all accessories, condition perfect; worth £60; no reasonable offer refused.—17, Uxbridge Rd., Hawwell, Middlesex. [X3602]

## O.K.

O.K. Juniors.—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn. [6910]

O.K. Junior, Mark IV, standard, new; 38 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3776]

1915 O.K. Lightweight, 2-speed countershaft, almost new; bargain; £25/10; private owner.—Harris, 56, Chestnut Rd., West Norwood. [6485]

O.K., 2½ h.p., 2-speed, completely equipped, and in excellent condition; £21, no offers.—Longman Bros., King St., Acton. Phone: 1578 Chiswick. [6554]

## Omega.

1915 2½ h.p. Omega, 2-stroke, B.B. carburettor, E.I.O. mag., in good condition; £16/10.—Whale, Bacombe Warren, Wendover, Bucks. [6421]

## Peugeot.

6 h.p. Twin Peugeot, free engine combination, very fast, sports bike; any trial here; £30, or offers.—Goodall, 2, St. John's Terrace, Kingston Vale, Patney. [6550]

## Precision.

PRECISION, 1913, 4½ h.p., 3 speeds, and coachbuilt sidecar; £29/10.—Motor Exchange, Horton St., Halifax. [6592]

## Premier.

PREMIER, 1913, 3½ h.p., countershaft gear, and coach sidecar; £37/10.—Motor Exchange, Horton St., Halifax. [6588]

PREMIER, 1913-1914, 3½ h.p., chain-cum-belt, 3 speeds, free engine, splendid condition; bargain; £24.—12, Roslin Rd., St. Acton, W.3. [X3666]

PREMIER, 1916, 3½ h.p., 3-speed countershaft gear, £45; 1916, with sidecar, 3½ h.p., spare tank, £69; extended payments or exchange.—Service Co., 292, High Holborn. [X3770]

2½ h.p. Premier, at Ascot, in perfect running order, as new, long exhaust, electric head and tail, horn, spare belt, spare tyre, tool kit, 125 m.p.g.; £25, or good offer.—Box 1,118, c/o The Motor Cycle. [X3664]

1913 Premier, 3½ h.p., wicker sidecar, N.S.U. 2-speed, F.E., new 1916, Bosch, B. and B., auxiliary exhaust and rear wheel new, tyres as new, Lucas lamps, no winter use, splendid hill-climber, magnificent condition, spares; inspection, trial; £26/10.—Avery, Matlock Bath. [X3808]

## Quadrant.

QUADRANT 4 h.p., 1916 Combination, 3-speed, all-chain drive; £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6508]

3½ h.p. T.T. Quadrant, Bosch mag., B. and B. carburettor, hot air intake, good tyres, runs well on paraffin, excellent condition; £13.—Kent, Sussex Lodge, Beckingham. [X3724]

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## MOTOR CYCLES FOR SALE.

## Radco.

RADCO, 1914, 2½ h.p., single speed; £12/10.—Lamb's, 151, High St., Walthamstow, and 60, High Rd., Wood Green. [6305]

## Rex.

REX, 2½ h.p., 3 speeds and free engine, Bosch mag.; £24/10.—Motor Exchange, Horton St., Halifax. [6589]

REX 6 h.p. Combination, Bosch mag., Mabco clutch, powerful machine, in good condition; £20.—Searle, 98, Walpole Rd., St. Yarmouth. [6425]

REX Motor Cycle and Sidecar, 1913, 5-6 h.p., 2 speeds, free engine; £38; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3764]

REX, 1911-12, 6 h.p., B. and B. carburettor, mag., Druid spring forks, new tyres, just overhauled at Rex works; any trial; £17.—7, Talbot St., Kidderminster. [X3607]

1914 Rex de Luxe Combination, hood, screen, 3-speed chain drive, not used for 15 months, in new condition; sacrifice £60, lowest.—Varrall, Grocer, Amen Corner, Totting. [6405]

## Rex-Jap.

6 h.p. J.A.P. (Rex-Jap), complete with coachbuilt sidecar, 2-speed gear, spring seat, in splendid condition; £60.—Turpin, 29, Preston Rd., Brighton. [5500]

## Rover.

1917 Rover and Sidecar, first-class order; £85.—On view Tye's Garage, Sevenoaks. [6482]

If You Want a Rover, write us for motor cycle list.—Walbro Motor Co., Ely, Cambs. [X3746]

ROVER, T.T., brand new, actually in stock.—Percy and Co., 337, Euston Rd., London. [6641]

COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [6883]

ROVER, 3½ h.p., clutch model, thorough order, engine just overhauled; £21.—S., 17, Johnson St., London, W.8. [6400]

3½ h.p. Rover and Sherbourne sporting sidecar; rare bargain; sacrifice; called up; £32.—Fairhurst, Rylance Row, Wigan. [X3600]

ROVER Motor Cycles, 1917 models from stock; £74/10; two only; first cheque secures.—Colmore Depot, 211, Deansgate, Manchester. [6887]

ROVER, 1915, countershaft, 3 speeds, clutch, Lucas accessories, tools, good condition; £46; owner enlisted.—Fox, 600, Fulham Rd., Fulham. [6401]

ROVER, 3½ h.p., 2-speed, all accessories, and tools equal new; £30; with sidecar £35; runs on paraffin.—Box L4,238, c/o The Motor Cycle. [6581]

ROVER and Sidecar, 1916, 3½ h.p., 3-speed, perfect condition, little used, speedometer, 3 lamps, horn, complete tool kit, overalls, and petrol; £50.—5, Gairloch Rd., Camberwell. [6545]

ROVER, 1916½, 3½ h.p., countershaft model, full accessories, tools, F.E.S. combined acetylene electric lamps, perfect condition, unscratched; £62.—Ratcliffe, Cleveland Rd., Lowestoft. [6435]

## Royal Ruby.

ROYAL Ruby, 2-stroke, single speed, new; £29/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X3781]

1916 Royal Ruby, 2-stroke, with light sidecar, extra fast, powerful; £24, or separate.—Thorpe, Whitehorse Rd., Thornton Heath. [6493]

DEC., 1916, 2½ h.p. Royal Ruby, 4-stroke, 2-speed, J.A.P. engine, as new; owner on active service; bargain; £28.—Apply, 195c, Cheltenham Rd., Bristol. [X3797]

## Rudge.

RUDGE Multi, 1916, almost new; £45.

RUDGE, I.O.M., T.T., as new; £50.

RUDGE, 1914, N.S.U. 2 speeds, in nice condition; £23.—Percy and Co., 337, Euston Rd., London. [6630]

If You Want a Rudge, write us for motor cycle list.—Walbro Motor Co., Ely, Cambs. [X3748]

RUDGE, single, 3½ h.p., 1914, good condition; £18.—Mappin, 22, Norris Rd., Sheffield. [X3589]

1914 Rudge Multi, 5-6 h.p., cane sidecar, fine condition; £35, or near offer.—Bull's, Westgate, Mansfield. [X3663]

RUDGE Multi 3½ h.p., 1913 Combination; £43.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6504]

1913 Rudge and Sidecar, 3½ h.p., N.S.U. 2 speeds, not used last 2 years; £22.—Clough, New Hall Hay, Rowntestall. [X3585]

RUDGE, 1914, clutch model, kick start, splendid condition, fast, smart, and economical solo mount; £30.—Mary's Lodge, Grove Rd., South Woodford. [6544]

1914 Rudge, T.T. Model, 3½ h.p., nearly new tyres, thoroughly overhauled, in fine running order, very little wear; £25.—Cain, 38, Briton St., Leicester. [X3721]

3½ h.p. Rudge, free engine, £14; also 3½ h.p. Premier, free engine, 3-speed gears, with box carrier and sidecar; £24; splendid condition; seen after 7 p.m.—W. Haynes, 252, East St., Old Kent Rd., S.E. [6535]



# THE MOTORCYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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## Clean Engines.

THE old proverb concerning the matter of "cleanliness" is no less applicable to motor cycles and their riders than to other affairs of life. A dirty machine is hardly a pleasant thing to look upon, and it has a nasty habit of communicating its filth to the man handling it. Dirt, therefore, is a very poor advertisement for the pastime, and it behoves manufacturers, in designing after-war models, to do their utmost to keep their products as clean as possible.

The motor cycle is prone to dirt of two kinds—oil thrown from the engine and mud collected from the road. The latter evil has received a good deal of attention of late, with the result that mudguards have been greatly improved, but there is still much to be done in this respect. A small undershield is a very great improvement, as it not only keeps the rider clean, but further protects the engine from mud and grit. The motor cycle engine works in a pre-eminently exposed position. Most of the time its external moving parts are working in a cloud of grinding material. This, of course, applies to many machines which have unprotected tappets and valve stems.

We now come to the other evil—the leakage of oil. To make a crank case or gear box absolutely oiltight is a very difficult matter which has been very rarely accomplished. In many cases there are far too numerous excrescences, nooks, crannies, and corners in which mud and oil mixed collect, and this is extremely difficult to extract, even with the aid of a stiff brush and frequent applications of paraffin.

The crank case, therefore, which is bound to get a little oil on it, owing to the lubricant gradually working past the tappets and bearings, should be devoid of inaccessible corners and raised lettering, and should be as neat as possible. Where it is desired to strengthen the aluminium by means of lugs, corners

should be rounded so that they can be easily wiped over.

## Cleanliness and Depreciation.

Projecting nuts are a nuisance to the man who takes a pride in his machine. Though they are perhaps a more satisfactory means of securing the two halves of the crank case than the countersunk screw head, still the latter has many advantages. A crank case fitted with a proper relief valve, which passes any surplus oil clear of the machine, is a great blessing, and attention should be paid to this point.

There is one method of lubrication which renders it quite impossible to keep an engine clean, and that is the petroil system, and, though it has been acknowledged to be the most satisfactory method of lubrication for a two-stroke, it is extremely bad from the rider's point of view. The oily mixture which leaks from the filler cap and the carburetter float chamber gradually spread over adjacent surfaces, and eventually reaches the rider's overalls—a very serious disadvantage to all those who take pride in their personal appearance.

It is up to the manufacturers, then, to aim at external cleanliness, for many riders have not much time to spend in cleaning and polishing; while it is an entirely hopeless task to attempt to keep a machine decent which sheds oil from its tappets, its timing case joints, and sundry other cracks and crevices.

It is a short-sighted policy on the part of a manufacturer to render a machine difficult to clean. Those who are careless in this respect get a very poor advertisement for their products, which always look dirty, because the motor cyclist will not take the trouble to look after them properly. If the manufacturer makes the rider's task easy the latter will not shrink from performing it. If, however, the cleaning job is too difficult a one the rider will naturally shrink from his task, with the result that the machine is dirty, and the presence of dirt almost undoubtedly proves neglect.



## Noisy Carburetters.



Valve Clatter depends not only on Tappet Design, but upon the Carburetter and Induction Pipe.

THE writer has many times proved to his own satisfaction that quite a considerable amount of the clatter audible to the rider of a machine emerges into the open air *via* the carburetter. To give a single illustration. Recently I have been riding to and from business a two-stroke lightweight, which, comparing it with other machines of a similar type, always struck me as unnecessarily "fussy." Wishing to adapt the machine for the consumption of heavy fuels, I fitted, a few days ago, a hot air intake with a suitable form of muffle, and, remounting, I was at once struck by the soothing quietude of the engine. Evidently, then, half the clatter of former days had emerged through the carburetter, while the extension now fitted acted as a carburetter silencer! It further explains why the metallic clatter of the engine increased in proportion to the throttle opening, for the further the throttle was opened the greater the volume of sound allowed to pass from the scurrying internal mechanism.

I remember that on another occasion I utilised part of an old horn as a hot air intake, the funnel-shaped extension drawing its supply from the cylinder fins. This fitment converted the carburetter into a miniature gramophone, so that the clatter of the valves at the other end of the induction pipe was so much accentuated as to be almost deafening. On opening the throttle and allowing the noise to pass out freely, one obtained an impression of wonderfully improved acceleration; as a matter of fact the acceleration was the same as before, and one was merely reminded of every response to the throttle by the fact that the throttle not only governed the speed but also the noise!

### Carburetter Design.

During various tests of various carburetters I have noticed that some are distinctly "more silent" than others; that is, the design of some—accidentally, no doubt—is such that it baffles the internal racket of the engines, while others, on opening the throttle, lay the internal mechanism open to the air. It must be remembered that, in the case of a four-stroke, two or four valves are clattering up and down on their seatings at the immediate end of the pipe to which the

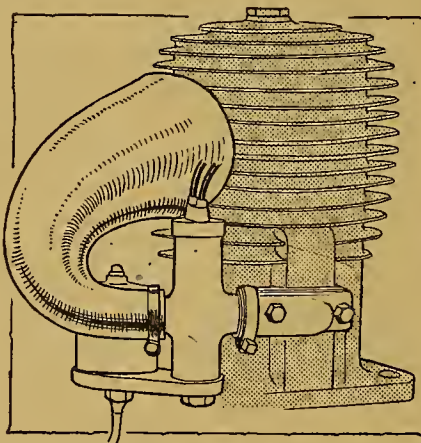
carburetter is fixed, and by opening the carburetter their rattle may be entirely exposed to the air—save for a filtering gauze. With a steam engine one hears no internal clatter of piston rings, etc., because the induction of a steam engine is closed, jointed, and sealed, and only by holding one's ear to the induction pipe (which is bad for the ear) does one become aware of the internal clatter of the cylinder.

### Deadening Sound.

Let us take it, then, that quite a considerable amount of the clatter audible to the rider travels along the induction and escapes *via* the carburetter. It is conducted to the open not only by the "air" contained in the induction pipe, but by the induction pipe itself, which is a veritable sounding box. I stand steadfast in the belief that the ultimate silencing of a motor cycle engine depends not so much in any radical alteration in design, as in the employment of sound-deadening materials wherever possible. Even the thin fibre packing between the crank case and the cylinder helps to deaden the metallic ring, and if you wish to illustrate this point still further, just fix the lid of a tin between the lock-nuts of your engine-shaft sprocket, and you will find that the tin re-echoes and accentuates every metallic note of the engine. Then place a fibre washer on either side of the tin, so that it is gripped between the sound-deadening materials, and it has no effect upon the noise produced.

The metal induction pipe merely acts as a sound conductor, and therefore the question arises, Why make the induction pipe of metal? True that it has valuable heat conductive properties, but vapours condense more readily on a metal surface than they do on, say, the surface of fibre.

Induction pipes made of some suitable fibrous material would, I am sure, not only have the effect of deadening the noise of the valves, but would lead to better fuel consumption. If a hot air intake were fitted, the induction pipe would absorb practically none of the warmth from the incoming charge, which would therefore gain the cylinder in a dry state. The fibre induction pipe would eliminate air leak, as no expansion sleeve would be necessary. **WHURNSIDE.**



By using this type of air intake the writer was convinced that a great deal more engine clatter is conveyed *via* the carburetter than is generally realised.



# Occasional Comments

by "Ixion"



## R.F.C. Recruits.

SOME of our readers have expressed disappointment and perplexity that it is not very easy to enlist for temporary service in the R.F.C. I have no official information on the subject, but any thoughtful person will recognise that, whatever happens to other arms of the service, the Flying Corps will have to be maintained at something approaching full war strength unless or until international limitation of armaments is established. Its importance to this country in particular will very soon exceed that of the Army or Navy. This fact would supply ample justification for any policy which aimed at getting the cream of our young men into the flying services, and keeping them there for a term of years. The point is emphasised when we reflect that practically every job in the R.F.C. is a technical job, and usually one at which no man can become really efficient on the short service system, unless he chances to have had prolonged civilian experience of somewhat similar work.

## Oil Grades and Smoky Exhausts.

PERHAPS Mr. Brooker, or some other oil expert, will comment on the following experience. I own a certain engine, on which I have meekly used a particular lubricant for 5,000 miles, in childish reliance on the maker's recommendation. It proved itself a champion plug-sooter, and I began to fine down the oiling to terms of cubic millimetres. You remember the Greek philosopher who had just taught his horse to subsist without food when it died? Well, I had just cured that engine of its plug-sooting propensities when it seized. So in the next spasm I utilised adapters to hoist the plugs out of the oil shower. One day I ran short of oil on the road, and was compelled to buy some of that thick sludgy stuff which everywhere passed as "air-cooled" oil until the castor dopes came in. I filled up with this semi-solid stuff rather timorously, and noticed, to my joy, that the exhaust immediately ceased to be visible. Out came the plug adapters, and since then I have used no other oil, plug-sooting has ceased. But I am puzzled. I suppose my pistons have at least 3-1,000in. clearance at their tightest point, and such a clearance must be equally an open path to two such diverse lubricants as Price's "A" and "Huile de Luxe." The cylinder walls and piston skirts are therefore all aslop with oil in both cases. Then the spring of the rings permits the thin oil to squeeze past, but not the thick. Or, alternatively, the heavier oil gets splashed less than the thin! I cannot see daylight through this quaint little fact, and am, on the whole, inclined to wonder if my piston rings gummed into the grooves on the thin oil and leapt out like unicorns when I used the thick stuff! Wish I were a pukka expert and could solve all my worries on half a sheet of notepaper with half a dozen assorted Greek and English capital letters and ten places of decimals.

## Oily Plugs on Efficient Engines.

A NUMBER of correspondents continue to enquire for a sparking plug which will stand "revs." and yet won't oil up. The answer is that no such plug exists—at any rate, for us. The R.F.C. and R.N.A.S. may have some, though I doubt it, as their engines seldom exceed 1,600 r.p.m. But there is no plug sold to the public which will keep cool on a super-efficient engine and at the same time burn off any surplus oil which may be thrown on its points. The rider for whom this problem has become acute has two alternatives open to him. He may mount his plug (or plugs) in a screwed adapter, which will hoist it half an inch or so higher out of the oil-splash zone and give it a better chance to keep clean. Or, alternatively, he may perfect more precise lubrication methods. Makers do not deliver machines which necessarily soot up a plug every few miles, but they do—most reprehensibly, of course—sell machines which soot plugs unless the user is very, very accurate alike as regards (a) grade of oil; (b) amount of each charge, or rate of drop, as the case may be; (c) varying the oil feed to suit the load and work.

## The "Unit" System.

66 CHINOOK" has dealt ably with the pros and cons of the engine-cum-gear box unit system, and I am wholeheartedly with him. To my mind it possesses two very great merits from the standpoint of reliability and wear. A manufacturer may turn out a splendid engine and a splendid gear box as separate units, but he is certain to have a high percentage of the gear boxes returned to him for repair after mileages ludicrously inferior to those which his testers obtain. The trouble usually arises from one of two causes: Motor cyclists are careless customers, and it is a tedious and messy job to introduce lubricant into an astern gear box through the official orifice, which is usually small and inaccessible. Insufficient oil is inserted, and a lot of it gets squeezed out. Many of the gear boxes issued by some makers come back with injuries due to under-lubrication after quite brief service. Secondly, the amateur is trusted to adjust the chain drive between separate engines and gear boxes, and he is not always trustworthy. Some makers guard against the amateur's tendency to dis-align his gear box; on one Matchless model, a circular gear box can be rotated eccentrically; on one Douglas model the gear box alignment is ensured by a slide way. But on too many machines the gear box is slung from hanger-bolts, which are a loose fit in a slotted bracket, and many amateurs lock up such gear boxes on the cross. Both these dangers are eliminated by the adoption of the "unit" system, which provides for automatic lubrication and inevitable alignment. Thus the system endows the purchaser with a more reliable machine, and protects the manufacturer from much trouble with his less clever clients.



# MOTOR CYCLE AND CANOE IN THE SHETLANDS



A unique home-devised attachment to widen the health and pleasure giving scope of the motor cycle, and particularly adaptable to such regions as the Shetlands, where there is such a variety of places where one can indulge in canoeing. The author's canoe was made interchangeable with the sidecar body, enabling him to use it in many of the lochs and voes which otherwise he could not have explored.

**T**HE outfit to which I have made the unusual additions about to be described is a 1914  $3\frac{1}{2}$  h.p. P. and M. with basketwork sidecar attachment. Regarding this machine I cannot speak too highly, its power and reliability being all that one might wish for—even in this region of hills and where roads are not of the best.

In order to adapt the sidecar for carrying the canoe, as shown in the illustrations, my first act was to add an extra leaf to each of the springs, and it was necessary, of course, that the sidecar would mount either the standard body or the canoe at will. My next move was to alter the bars that connect the springs, and on which the sidecar body is mounted, in such a way that they slipped in or out without disturbing the springs themselves, and by simply removing the nuts at the ends of the rods.

It required a good deal of thought before a suitable plan was hit upon, but finally I got over the difficulty by shaping a thin flat bar of iron to fit the inside of the canoe. The ends of this strip of iron protrude above the gunwale of the canoe on either side, and have holes in them which register exactly with the holes in the ends of the springs, so that with the canoe in position the two can be held together simply by means of bolts having thumb nuts.

This was all right for the back connection, but the front ends of the springs being much lower required the making of a special detachable bar raised in the centre sufficiently to keep the canoe parallel, and fastened in the same way as the back connection already described.

## Making the Canoe.

As regards the canoe itself, as this is specially adapted to the work to which it has been put, a few

notes regarding its dimensions, etc., may be of interest. The length of the canoe is 11ft. overall, but it could safely have been made 12in. to 18in. shorter, as this would have eliminated a good deal of the whip which now takes place when cornering. The width of the canoe is 21in., and it is 12in. deep amidship. It is constructed from sheets of three-ply wood, the bottom being  $\frac{1}{4}$ in. thick, sides and back  $\frac{3}{16}$ in. It is built up of six longitudinal stringers of elm,  $1\frac{1}{8}$ in.  $\times$   $\frac{3}{4}$ in., steamed and bent to shape. The bottom is in three equal sections, the centre part being flat, while the others slope gradually upwards to the sides and ends, and finally taper off. All the seams are set in white lead and fastened with brass screws and copper nails, while the bottom is covered with thick cotton. The canoe is coated inside and out with several applications of oil paint, and finished in green Robbialac, lined black. The result is a perfectly watertight canoe, having a total weight, with all accessories aboard, of approximately 1 cwt. The cost of material was about £7, war time prices.

## Fitting the Floats.

Coming now to some of my own experiences, which date back with canoes to the old simple canvas-built type with strips of cheese boxes for ribs, the following notes regarding the outfit may be included. I have found that on every sidecar I have measured, the distance between the mudguard stays and the connections of the sidecar chassis is not sufficient to enable one to swing a canoe having a sufficient width to render it safe on the water. I therefore put into practice an old idea among outriggers, that of employing two light boat-shaped floats projecting from either side of the canoe, the metal parts of this arrangement being the two halves of an old F.N. stand—arranged to



**Motor Cycle and Canoe in the Shetlands.—**

screw on to the same nuts that fasten the canoe on to the chassis, this addition rendering the canoe quite safe even with two passengers on board in a fairly choppy sea.

**A Novel Method of Propulsion.**

The security of the little craft now tempted me to try the more exciting sport of sailing, and, as many readers are doubtless aware, the delightful sensation of sailing in a canoe, with its ever-present touch of risk, is only equalled by going all out on a fast motor cycle.

Finally, as a change from sailing, and also from the rather tedious work of paddling in calm weather, I constructed a small ball bearing hand-driven propelling mechanism, which is capable of driving the canoe at a fair speed. As a detailed description of this and the all-important steering gear involved would take up too much space, I will leave the subject in order to deal with the more fascinating pastime of motor cycling in the Hundred Islands of the Shetlands.

of all makes and various dates of manufacture. A friend of mine, a traveller, has the creditable mileage of over forty thousand on his early 1913 2¾ h.p. Douglas, which looks good for many thousands more.

At the present time—owing to the petrol restrictions and the fact that the bulk of the male population is with the Colours—motoring here, as elsewhere, has greatly diminished, but with the return of brighter times I can think of no better place for the tired campaigner to rest and recuperate than these quiet northern isles, where the fresh healthy ozone breezes



Where the mobility of the motor cycle is an advantage. The canoe can be taken to the water's edge and lifted from the chassis directly to the water. (Inset) When the canoe is used for sailing the floats act as stabilisers; in this view the hand-propelling gear is in action.



Two or three of the larger isles only, together with the mainland, are adapted to motoring; the roads are fairly good but hilly, and as no part of the land is more than three miles from some arm of the sea, the roads wind about considerably, with not a few hair-pin bends. There are no trains or trams in the Shetlands; nor are there ever likely to be, consequently motor cycling in the isles has very much come to stay. Business men and others have not been slow in finding out the extreme usefulness of their mounts, which are

will soon vanquish the effects of poison gas, etc. In the summer one can enjoy the novelty of cycling until midnight *without lamps*, and then indulge in a game of golf, although we do not actually see the midnight sun. If the tourist be a fisherman he can indulge his hobby all day with the certainty of good sport in the many lochs and voes that abound all over the isles. The hotels are good, and the Shetland Isles are easily reached by regular steamboat services from Aberdeen.

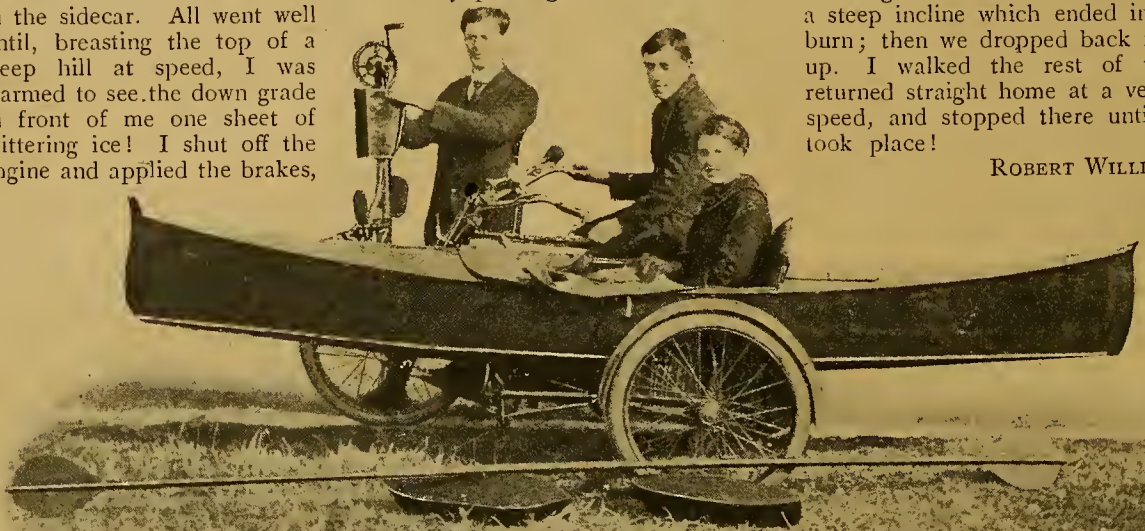


### Motor Cycle and Canoe in the Shetlands.—

To finish this article, I would like to relate one experience of my own last winter that may serve to illustrate the dangers of cycling anywhere in hilly country when the ground is covered with ice. I left the town of Lerwick for a trip of about forty miles to the north end of the mainland with a lady passenger in the sidecar. All went well until, breasting the top of a steep hill at speed, I was alarmed to see the down grade in front of me one sheet of glittering ice! I shut off the engine and applied the brakes,

but was too late to stop, and we started to slide down the hill, gathering way as we went. I tried to steer for the ditch, but it was useless, as the whole outfit gradually turned sideways, then stern first. I was hanging on, and praying for a soft spot, when we dashed into a ditch, and for one hair-raising moment the sidecar wheel lifted and hung in the air, while I hung over a steep incline which ended in a rocky burn; then we dropped back right side up. I walked the rest of that hill, returned straight home at a very steady speed, and stopped there until a thaw took place!

ROBERT WILLIAMSON.



The "real" canoe sidecar. Observe the floats and paddle, also the hand-propelling mechanism.

## AT THE CLUB HOUSE.

### A Question of Average Speed.

OUR club notice board appears the following: *Problem.*—A motor cyclist completes one half of a journey at 20 m.p.h. and the remaining half at 30 m.p.h. What is his average speed for the full journey?

Somebody has written in answer, "Smithkins knows," and this is the story.

Smithkins came in blinking his eyes. He had just made the journey to town and back—a stiff day's riding.

"When I get all these flies out," said he, rubbing his face with a handkerchief, "I'll have two or three truckloads sent on to the Hun-Kadaverer-what's-its factory."

"What sort of a run had you?" asked Biffles.

"Not bad," answered Smithkins. "Only averaged 20 m.p.h. going out, what with one stoppage and another; but, coming back, I averaged 30 m.p.h. all right, and, let me tell you, it's not bad, taking into consideration the present state of the roads, to average 25 m.p.h. out and return on a lightweight."

"No; it is not bad," said Biffles. "But you did not average so much out and return."

"I tell you . . . averaged 30 m.p.h. back . . . 20 m.p.h. out . . . and if that's not averaging 25 m.p.h. . . . I will eat my—" (here he mentioned an article of apparel often worn by men).

"I hope you have a good meal," said Biffles, smiling, and then—"Well, I'm off. So long"; but,

half turning round as he reached the door, he added, "By the way, don't think I'm deprecating your to-day's performance—only disputing your arithmetic."

Just then, Dibbs, who had been repairing the flapper perch of his 2 h.p. Overplus, wandered in.

"What's the row?" he enquired. Smithkins opened out and gave it him full throttle.

"Well," said Dibbs, "I don't know what the trouble is, whether it's in the magneto, or the sparking plug, or the design of the exhaust valve cam." He paused in his speech, being occupied in dodging a repair outfit and its flying contents. "But if Biffles says you are wrong there must be something in it."

### A Case of Obsession.

Smithkins (who is on munitions) was late at work next day. For the remainder of the week he wore a far-away look and was very absent-minded. When you asked him for a match he put his hand in his pocket and gave you his pipe. Later he parted with his cigarette case and tobacco pouch in the same way.

About 11.30 on Saturday night the clubroom door suddenly burst open and Smithkins tumbled into the room. "I know" (in real life he would have said Eureka!), he gasped. "Twenty-four"—and then collapsed.

We covered him gently with an old rug from Biffles's sidecar, and shortly afterwards he fell into a deep slumber. A moist and healthy perspiration settled on his brow. We knew the crisis was past. ENGRO.



# MECHANICS FOR THE MOTOR CYCLIST.

## Third Instalment: INERTIA.

Previous instalments appeared on  
July 19th and August 9th.

It is hardly necessary to point out to thinking motor cyclists the great desirability of a little mathematical knowledge—so many questions may crop up, as, for instance, the horse power required to mount a certain hill, the tension of a belt or chain when driving a heavy machine, or the calculation of a gear, that the man who is entirely ignorant of these matters must often be at a loss. In this and the following articles (of which there will be several) the author proposes to discuss some of the simpler problems dealing with speed, acceleration, force, inertia, centrifugal force, etc., and their practical application to everyday questions in a popular manner without unnecessary technicalities. No motor cyclist, therefore, need pass by these articles under the impression that they are beyond his understanding, for everything is explained in simple language.

**INERTIA.**—When a force, acting on a body, produces acceleration the law of action and reaction still holds good, but in such cases the term “inertia force” is given to the reaction. Inertia force may be defined as the resistance that a body offers, to any change in its motion. This resistance is equal in magnitude and opposite in direction to the accelerating or retarding force.

Our tube railways give every facility for the experimental study of the laws of inertia, particularly if the student is prepared to subordinate his comfort to the cause of science by travelling as a strap hanger. To avoid any possibility of misunderstanding, let me explain that it is not suggested that inertia plays any part in the management of these concerns; nor, on the other hand, do I desire to enter into competition with the gentleman whose alluring posters advertising the advantages of underground travel form such a feature of Tube stations. In short, I wish to put forward the “usual disclaimer.” Without pausing to consider the numerous interesting problems in dynamics presented by the lift or the escalator, we will assume the seeker after knowledge to have secured standing room in a Tube carriage. The question of human inertia, as exemplified by those slow-thoughted travellers who call forth the conductor’s appeal to “pass farther down the car, please,” fascinating though it is, must also be passed by.

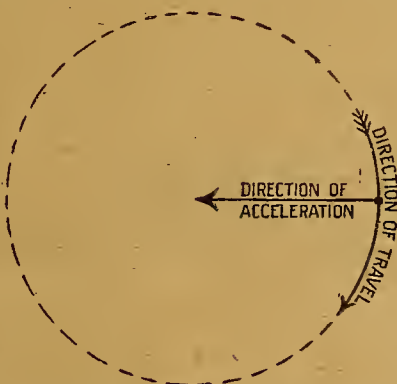
When the train starts our experimenter will find himself subjected to a force acting in the opposite direction to the direction of motion, of sufficient magnitude to send him staggering backwards down the car were it not for his firm grip of the hanging strap. Observe that there can be no possible doubt—no probable, possible shadow of doubt—about the existence of this force; its effect is just as undeniable as if the subject were pulled violently backwards by some human agency. The stoppage of the train is marked by similar phenomena, except that this force whose effects we are studying

now has a tendency to propel the passengers in a forward direction.

Let us see how these facts square with the definition of inertia force already given. During the acceleration of the train it is, of course, necessary that every passenger in the train must also be accelerated. To impress this acceleration on the passengers force is required. In the case of a strap hanger, the only available means of transmitting this force to him are the friction of his feet on the floor of the carriage and the pull of the strap. This applied force—the “action”—calls into play an equal and opposite reaction which we have spoken of as the force of inertia. The tendency of the passengers to lurch forward on the train coming to rest is explicable on similar lines.

There are, however, other occasions beside the starting and stopping of the train which tend to disturb the travellers’ equilibrium. When a curve is traversed a force manifests itself, impelling them to the right or left of the car. Except that this force acts transversely, instead of in a fore-and-aft direction, its nature is identical with that of the inertia force just discussed. We are therefore led to the somewhat puzzling conclusion that, although the train does not alter its speed, it yet undergoes acceleration. It is at this point that the full significance is revealed of the concluding words

of the definition quoted in the preceding article: “Force is that which changes or tends to change a body’s state of rest or of uniform motion in a straight line.” Now you can change a body’s state of uniform motion in a straight line in two ways. Either you can make the body move faster or slower while still maintaining the same direction; or the body can be diverted from a straight into a curved path, no alteration being made to the linear speed. Force is required to effect either of these changes. In the first case, linear acceleration is the result; in the second, what is known as *radial acceleration* is brought about. Any object travelling in a curved path is subjected to this radial acceleration,



When a wheel is revolving at a uniform speed every point on it has an acceleration to the centre, as is shown in the above diagram.



### Mechanics for the Motor Cyclist.—

which always acts towards the centre of the circle along which the object is moving.

Thus, the direction of the acceleration of a body traversing a circular path is as shown by the arrow in the figure. The existence of the force necessary to impart this acceleration can be proved easily enough. If a stone attached to a string be swung round in a circular path, it is common knowledge that a constant inward pull must be exerted on the string.

In exactly the same manner that an object does not suffer its linear speed to be changed without an effort, so the object resists any tendency to force it from its straight path. In the one case, we have termed this resistance or reaction the "inertia force"; in the other case, although the reaction is just as indisputably an inertia force, we give it the distinguishing title of *centrifugal force*. So numerous are the ways in which

this force affects the motor cyclist that a separate article is necessary for its adequate consideration.

It may, however, be permitted at this stage to moralise a little on the behaviour of animate matter when undergoing changes of motion. Those readers who find that they, too, offer great resistance to anything that disturbs or tends to disturb their state of rest—who are, in brief, what an unfeeling and unscientific world calls lethargic, or even lazy—can draw consolation from the knowledge that, after all, they are only acting in accordance with the immutable laws of Nature. But I fear that the value of this reflection will be entirely nullified by the fact that it will never meet the eyes of those who might benefit by it; for, quite apart from the inherent improbability of there being any indolent readers of *The Motor Cycle*, the inertia of such rare specimens as may exist would effectually prevent their studying articles of this kind.

(To be continued.)

## THE TRIUMPH GEAR BOX.

### A RECENTLY PATENTED METHOD OF OPERATION.

THE accompanying sectional drawing shows a system recently patented by the Triumph Cycle Co., Ltd., whereby the gears are shifted by means of spring controls, so that a movement of the lever from one position to another need not necessarily mean a simultaneous movement of the gears. As every rider knows, it is detrimental to the internal mechanism of a gear box to change from one gear to another when the gears are under load, but, on the other hand, it is an advantage to be able to shift the gear lever from one position to the next in the knowledge that the change will not take place till the load is momentarily released, when (by a movement of the exhaust control or the throttle) the dog clutches slide automatically into place—perhaps some seconds after the movement of the lever.

Such foolproof mechanisms for gear changing are already widely used, and, apart from the spring-striking gear reducing the likelihood of mishap in the hands of an uninitiated rider, add much to the convenience of control from the point of view of the expert.

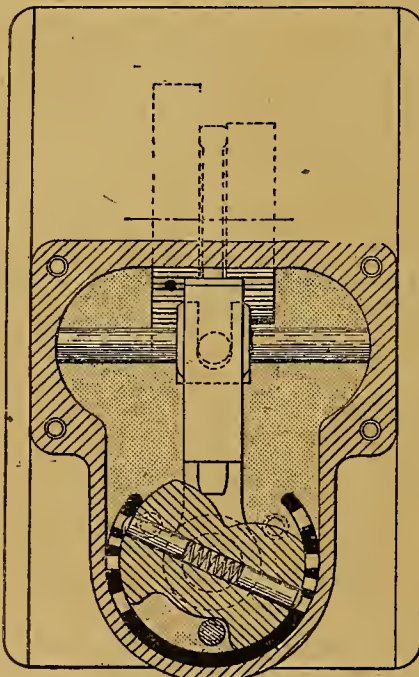
The accompanying drawing, which is a front elevation partly in section with the front of the casing removed, requires some explanation.

The drawing is made purely to show the actuating mechanism, it being taken that one is looking on to the end of the shaft mounting the change-speed lever. The movement of the gear lever rotates the cam, which is mounted on the same spindle as the lever. It will be observed that this cam contains two plungers, held outwards by a spring housed between them. It will further be observed that holes are cut in the

cylinder in which the cam is carried to receive the ends of the plungers as the cam is rotated from one gear position to another, thereby acting as resilient stops for the various gear positions. These four holes, then, represent respectively the first speed, neutral, second, and top.

The upright arm strikes the dogs from one position to another by rocking either to left or right on the spindle mounting the cam, and this motion is imparted to it by the motion of the cam through the spring plunger contained in the arm and bearing upon the face of the cam. As shown in the drawing, it can be taken that the gear lever has been shifted from second speed to first speed, but the gears being under load have resisted the movement; therefore the spring plunger has been compressed upwards, the arm remaining stationary. Immediately the gears cease to yield resistance, however, the pressure of the spring will cause the plunger to ride down the face of the cam into the groove, automatically swinging the arm into first gear position. On the underside of the cam a stop is shown, the sole object of which is to prevent the cam turning too far in either direction.

One advantage this mechanism immediately suggests is that the gear "quadrant" is contained in the gear box, and thereby sheltered from grit and shielded from damage. The patented operating mechanism is certainly ingenious, and the gear box should present a clean exterior, there being no outside fittings exposed to wear and requiring lubrication—this latter point being an important one as regards external cleanliness.



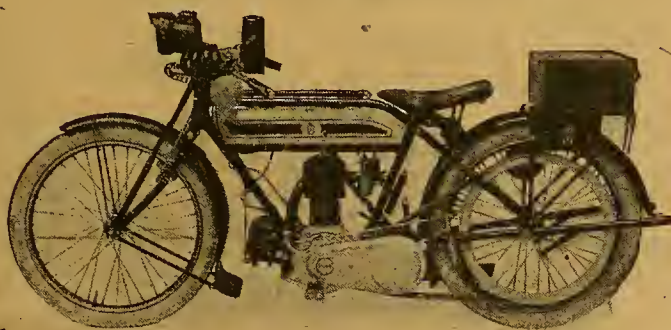
Front elevation showing the control system employed in a gear box recently patented by the Triumph Co.



THE

**TRIUMPH****T**

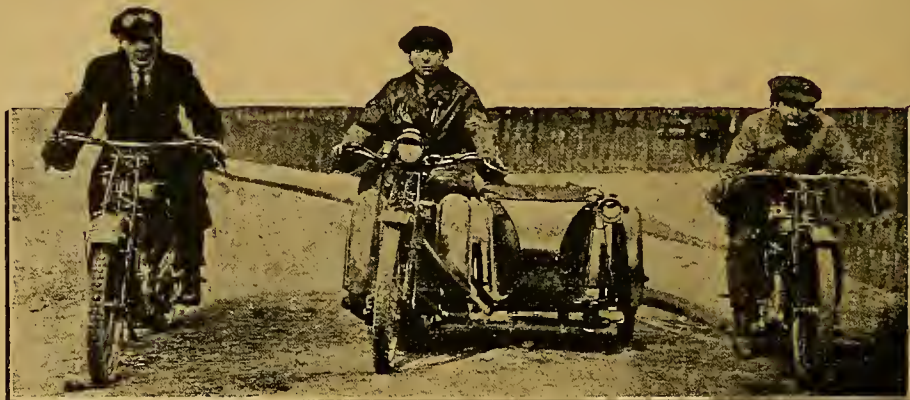
HUNDREDS of letters  
of appreciation have  
reached us from Officers  
and Despatch Riders,  
expressing highest satis-  
faction at the outstanding  
reliability of their  
TRUSTY TRIUMPH.

**T**

TRIUMPH CYCLE CO., LTD., COVENTRY.



# Why Dunlops?



*THE DUNLOP TESTING SQUAD that rode a weekly average of 1,000 miles per man for months — testing tyres — before the Dunlop rubber studded motor-cycle tyre was placed upon the market.*

## THERE IS NO GUESSWORK ABOUT **DUNLOP** MOTOR - CYCLE TYRES.

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FOUNDERS OF THE PNEUMATIC TYRE INDUSTRY.  
PARA MILLS, ASTON CROSS, BIRMINGHAM.  
OF ALL CYCLE & MOTOR-CYCLE AGENTS.





## MILITARY NOTES.

## A Further Selection of Photographs and Letters from Young D.R.'s.

## RECRUITING.

THE railway companies and the police have, we are informed, supplied their full quota to the 500,000 men asked for by the War Office by the end of July.

## 15 YEARS 10 MONTHS ON ENLISTMENT.

"I SAW in a recent issue of *The Motor Cycle* a query asking who was the youngest despatch rider to go on foreign service. Well, I think I go near claiming that honour.

"I enlisted on September 24th, 1915. I was with the Expeditionary Force in France from January 16th, 1916, until July 27th, 1916; then discharged on July 28th, 1916. From the day of joining to landing in France I was riding on Salisbury Plain and in the South of England. I spent a winter on the Plain and one in France, and was in three squadrons of the R.F.C. I had three new P. and M.'s in that time, two of them breaking under the head lug through sidecar work. I also received instructions at P. and M.'s on their machines.

"If you require any more particulars I will be very pleased to send them.

"I was born on March 11th, 1900, and am now 17 years 4 months.

"W. GILLINGHAM."

## CPL. E. APPLEBY SEES FOREIGN SERVICE AT 18 YEARS 4 MONTHS.

"I ALWAYS send my son out every week a copy of *The Motor Cycle*.

I happened just to look at it, and was surprised to see on page 85 the photograph and name of 'the youngest despatch rider.'

"May I mention that I think my son must be among the youngest D.R.'s, as he went to France at the end of July, 1916, and was only 18 in

the previous March, making him 13 years 4 months, and he has not been home since.

"ANNIE APPLEBY."

## A GOOD RECORD.

"ON reading over your paper I see a reader wishes to know if there has been a younger D.R. on foreign service than his son, William Roughley.

"My brother, John Barclay Chalmers, joined the R.E. as D.R. on the 1st July, 1915, when 17½ years old, went to France 21st August same year, and was at the battle of Loos. He was not 18 till the middle of November. He has been kept at it all along, and been only once home (May, 1916), so I think this is younger than W. Roughley, and likely there may be even younger ones out. "R. H. CHALMERS."



Cpl. J. B. Chalmers,  
R.E. (Signals).

## JOINED AT 16 YEARS 10 MONTHS.

"I READ with much interest the letter from a Rochdale reader which spoke of the youngest despatch rider on foreign service. Personally, I know of three, of whom I am the youngest, that can beat his record. I joined my present unit in France at the age of 16 years 10 months, and have since seen twenty-eight months' service under all sorts of conditions.

"I may also state I have never missed an issue of the 'Blue 'Un' since my arrival out here, and the boys are always anxious to borrow it.

"Wishing the paper every success,

"W. E. COOK,  
Cpl. R.E."

## AWARDED THE RUSSIAN CROSS OF ST. GEORGE.

MR. R. MOSELEY, of Walthamstow, sends us the following interesting information about his brother, who joined the M.M.G. when he was 16½ years old:

"I would inform you that my brother, Gunner K. Moseley, M.G.C., late M.M.G., whilst on active service in East Africa,

gained the Russian Cross of St. George. He writes regarding this as follows: 'You will be pleased to hear that I have been awarded the Russian Cross of St. George. The armoured motor cars went into action on August 17th, 1916, on a river named the Wami (East Africa), when they were signalled to retire. They could not see the signal, so I went and brought them out.'

"These are all the particulars I have of this deed, but I can give you a brief account of my brother's Army life.

"He joined the M.M.G. as a gunner in June, 1915, when he was 16½ years of age. About the November of that year he was promoted to bombardier, but gave up his stripe when he transferred to the 5th L.A.M. Battery in February, 1916, and sailed for East Africa. He was there until quite recently, when he was shifted to Egypt to recuperate after the hardships and fevers of the East African campaign. He is there now waiting to take up a commission in the R.F.C.

"I am sorry to say I have no photograph of my brother other than in a group of the 5th L.A.M.B., published in your issue of 24th February, 1916."

## A HARDENED CAMPAIGNER AT 17 YEARS 4 MONTHS.

"WITH reference to Mr. Roughley's short paragraph in your number dated July 19th, raising the interesting question as to who is the youngest despatch rider, I should like to mention that I enlisted as a despatch rider at the age of 14 years 10 months. I have already served with the Overseas Forces in France, Egypt, and Macedonia.



Cpl. F. H. Chadwell

"My present age is 17 years 4 months, having served in all sixteen months abroad. I was eventually claimed home by my parents.

"I should like to know if there is any despatch rider who can claim to be younger than this.

"Wishing your paper every success,  
"F. H. CHADWELL."



Cpl. E. Appleby. The mud-covered motor cycle will give an idea of the road conditions encountered.



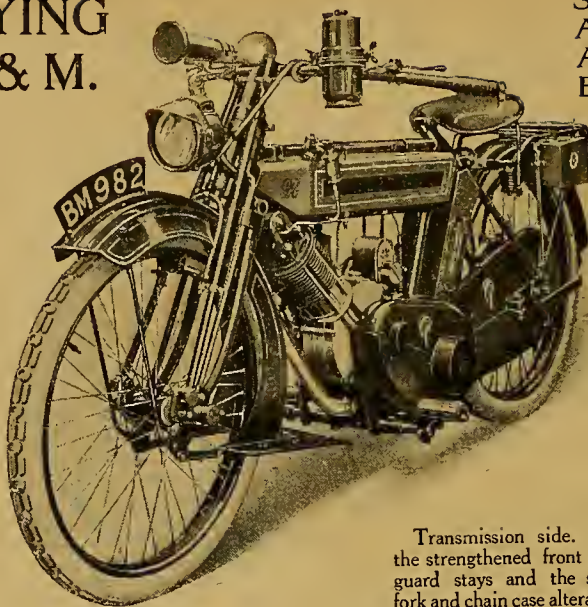
## ROYAL FLYING CORPS P. & M.

**W**E have from time to time alluded *en passant* to the various improvements that have been made in P. and M. motor cycles since the day—now seeming far distant—when the factory was handed over to the Government. Since then the private owner has contemplated the latest products of the factory from afar, and even the most patriotic supporters of the make, and there are many in the North—men who have ridden P. and M.'s since the very earliest days of the pastime, who have ridden nothing else, and who, perhaps, with the characteristic conservatism of the Celt, never intend to ride anything else—have been compelled to hold on to their old machines since 1914, or thereabouts, whilst the R.F.C. consumed the new.

### As a Double Purpose Mount.

P. and M. motor cycles are perhaps most remarkable for their unfailing reliability and for their wearing properties. There are few machines which, as an individual make, have been so much abused. The P. and M. was one of the first machines to figure as specially adapted to sidecar use—the chain drive and two-speed gear accounting for this. Anyone who possessed a P. and M. regarded it almost as a sacred duty to attach a sidecar to it, with the result that it developed along the lines of a machine specially fitted to meet the privations and hardships of life.

The wearing quality—that is, its long life as an absolute reliability mount—of the P. and M. is doubtless due to the very wide margin of efficiency, both as regards strength and wearing surfaces, of the machine throughout. The engine parts are massive, ground and finished to a very high standard of workmanship. While visiting the P. and M. factory we have, on many occasions, been struck by the thoroughness and minute care brought to bear on even the smallest and apparently most insignificant portions of the machine. Not a single point is scamped, and it is this combination of fine machining, good material, ample strength, and minute detail care which is at the root of P. and M. reliability and which accounts largely for its wearing qualities.



Transmission side. Note the strengthened front mud-guard stays and the spring fork and chain case alterations.

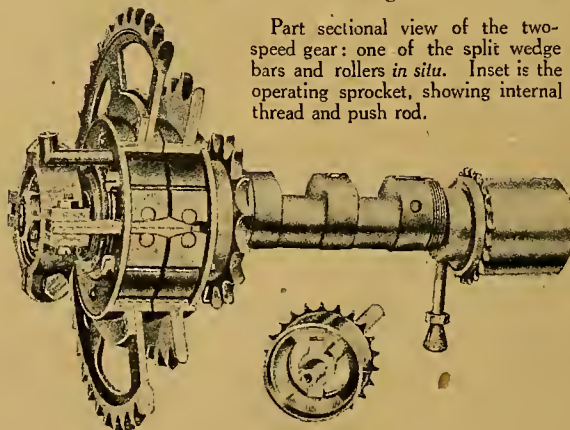
tain ascents, watersplashes, and so on, it has naturally partaken of those features which render a machine well adapted to such conditions. But it must not be imagined that "plugging along with a sidecar" is the sole purpose of the P. and M. Up to 1914 these machines could "hardly be described as antelopes of the road," as one writer has already put it, but 1914 saw an immense improvement in the speed of the P. and M. To-day the machines handed over to the Government are capable not only of "doing" 45 m.p.h., but of holding that speed for a considerable period, and this in delivery tune. We know from our own practical experience that on long journeys the P. and M. of to-day is certainly among the fastest of British machines of the single-cylinder touring type.

### Recent Alterations.

The chief alterations that have been made to the P. and M. since last we fully described it are mainly of the detail order, though none the less interesting and important. Every part of the machine which has been found to be lacking in strength during the strenuous trial of warfare has been strengthened or redesigned. This may sound a small matter, but let not the reader be deceived.

In pre-war days this machine was renowned for its solidity and strength of design, yet in the hands of the military the original peace-time model was found to be sorely lacking in strength. The most unexpected members fractured under the continuous strain, and various revisions and additions were found necessary during the early months of the war.

As regards the general lay-out of the machine no



Part sectional view of the two-speed gear: one of the split wedge bars and rollers *in situ*. Inset is the operating sprocket, showing internal thread and push rod.



**Royal Flying Corps P. & M.—**

radical alterations have been made, but the new gear and the fresh points of design in the spring fork mechanism are certainly worthy of comment.

**Gear Improvements.**

Having had considerable experience with the new gear, we are able to discuss it with some freedom. One of the most marked improvements from the point of view of the practical rider is the adjustable wedge bars. With the old type of gear the wedge bars required renewing every 5-6,000 miles owing to the wear of the friction faces of the expanding phosphor-bronze rings. The renewal necessitated taking the gear entirely adrift—a task which many amateurs shied at—and sending to the makers for bars of the next gauge, a matter usually of some delay and inevitably of some nuisance. In the new gear all this trouble is done away with by the simple expedient of splitting the bars lengthwise, so that they can be thickened by inserting thin blades of steel down their centres, thus taking up the wear. These packing pieces are supplied in different gauges by the makers, and can be inserted with a pair of pliers after removing the small bolt which operates the wedge bar, the gear being placed in the neutral position during the operation.

Care should be taken, however, not to insert the packing pieces till the wear is shown to be considerable by excessive movement of the lever, for if the wedge bars be too thick this will cause both gears to bind at the same time. The mechanism then heats up to an extent which is likely to burn up the lubricant, and may thereby cause considerable damage. It should be noted, after inserting the packing piece, that the engine is quite free, and that there is some movement of the lever in the central position.

**Gear Lubrication.**

In the new gear the expanding rings are in two half circles, each ring being expanded by two wedge bars, and the friction surfaces of the rings are provided with diagonal oil grooves into which the oil is squeezed on the engagement of the gear. The rings are also larger than the original type, and on account of these revisions not only is the "take off" of the gear much smoother than of yore, its sweetness of engagement, and all-round efficiency added to, but its gripping qualities are no longer affected by the lubricant used. Those whose experience of P. and M. gears dates back some years will recall that the old pattern were apt to slip, if oil instead of grease were used; but in the new gear ordinary engine oil is the only lubricant required. A small brass force pump is—or should be—supplied with the machine, and by means of this a charge of oil is drawn from the tank supply and injected straight into the gear every 3-400 miles.

The lubricator consists of a small red elbow, protruding ostentatiously before the rider when the

gear case cap is removed from the chain case. This elbow receives the spout of the oil pump, and it contains a non-return valve, which prevents the oil being slung out by centrifugal force.

Though this way of oiling is easy and efficient, we have not found it to be very permanent, and we obtained better all-round results by screwing the non-return valve from the elbow and injecting vaseline by means of a pump having a screw-down plunger. The heat of the gear proved quite sufficient to keep the vaseline in an adequately liquid state.

**Spring Fork Revisions.**

The improvement of the spring forks is proportionately noteworthy. The old pattern, in which semi-circular plated members adjoined the wheel spindle and moved with a circular motion through the bridges embracing them, was prone to wear at sundry different points, and it was a matter of opinion whether or not the sliding plated members should be kept dry or lubricated. If lubricated they collected grit, which formed itself into a grinding paste, while if kept dry wear was still inevitable, as they formed a convenient lodging place for road slush, etc. In the new forks links are used in place of the semi-circular members, and screw-down grease cups of sensible size are fitted, so that grit is forced out of the large bearing surfaces by the act of screwing down the lubricators.



The present spring forks have few wearing parts, and the bearings are provided with large grease cups.

The detail improvements that have been brought into practice since the outbreak of war are numerous. The back wheel external contracting brake is strengthened and its efficiency increased. Originally the closing motion of the band was effected by the pull on one end only; now, by means of a bell crank arrangement, the band is tightened at both ends, ensuring an increased gripping surface and longer life for the lining. The band is, moreover, mounted in such a way that it cannot wander from its proper position.

The lamp-bracket is mounted on an extension of the main fork guides, and the back of the saddle pan is given an upward curve so that, with a heavy rider, it cannot bump the rear wheel mudguard. We are surprised to find that the original pattern front wheel mudguard has been retained, though it has been much strengthened as regards attachment.

**The Twin-cylinder P. and M.**

The P. and M. twin is, of course, gradually developing, though naturally circumstances do not permit any expenditure of labour upon it. This model, we are informed, with its four-speed gear and 90° engine, is to be the sidecar machine of the post-war catalogue, the two-speed single-cylinder model being the solo mount. Many, however, will probably regard the twin-cylinder model as an ideal solo mount, for it is not particularly heavy, while with its simple four-speed gear a very high top gear ratio could be utilised for solo riding. Both models are to be considerably altered as regards detail fittings.





## SPECIAL FEATURES

MOTOR CYCLE AND CANOE IN THE SHETLANDS.  
FROM SCRAP HEAP TO COMPLETE MOTOR CYCLE  
MECHANICS FOR THE MOTOR CYCLIST.

## TIME TO LIGHT LAMPS

## SUMMER TIME.

Aug. 23rd	...	8.37 p.m.
" 25th	...	8.32 "
" 27th	...	8.28 "
" 29th	...	8.24 "

## Second-hand Prices in France.

In France second-hand British-made motor cycles are fetching astonishing prices. One reader solemnly informs us of a four year old Rudge which fetched the equivalent to £96. Rather tall!

## A Missing Tube.

A reader asks us if we will gently request the rider of a Scott sidecar outfit, who was hung up between Newmarket and Barton Mills from 2.30 to 7 p.m. on Sunday, July 22nd, kindly to return to the stranger who took pity on him "the inner tube which enabled him to get home."

## A J.A.P. Enthusiast.

A garage proprietor was charged at Wood Green last week with feloniously stealing and receiving between February 1st and August 16th three engine cylinders, five pistons, 270 phosphor bronze bushes, fourteen valve caps, nineteen valves, eighteen cam levers, fifty-five piston rings, and other motor cycle engine parts, together value £69 10s., belonging to J. A. Prestwich, Ltd., Tottenham.

Although the majority of light-weight motor cycle manufacturers and ourselves strongly discourage attaching sidecars to this type of machine, the photograph shows the strenuous work lightweights occasionally perform, for Capt B S. Millard, R.E., and his passenger, Lt. H. J. Ingman, together weigh 30½ stones. The outfit is a 2½ h.p. Enfield.

## Is Pillion Riding Dangerous?

In pillion riding the chief risk lies in the fact that, if a smash *does* occur, two persons are involved instead of one, and the rider of the machine cannot help but feel himself responsible for his passenger. Further, the likelihood of risk is increased, for it is impossible to make so rapid a swerve to avoid mishap as when riding solo. A lady passenger, sitting sideways on the carrier, is not in a position to assist the rider or save herself in the case of side-slip, and therefore the practice of carrying a lady is more risky than that of carrying a man.

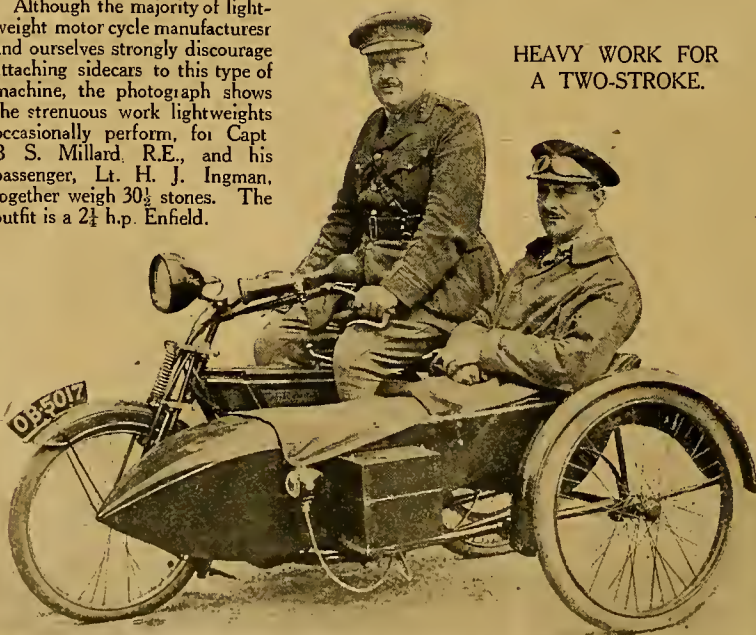
## Description of Stolen Machine.

The following is a description of the Matchless (Model 8B) motor cycle and sidecar stolen about midnight on August 14th from the Matchless works—Collier and Sons: Engine No., 34,572; frame No., C3,041; Hutchinson 750×75 mm. tyre on rear wheel and 650×75 mm. of the same make on sidecar wheel; Palmer Cord 650×65 mm. front wheel. It is a three-speed countershaft gear model, with silent chain drive; Lucas lamps, generator, and horn are fitted; also Stewart speedometer and hand warning horn fixed on front of sidecar body. A crack in the frame will shortly necessitate repair, and the sidecar mudguard and back mudguard are both damaged. There was a No. 2 Brownie camera and several spares in the sidecar body, and the outfit is enamelled Matchless grey, with green panel on tank.

## Average Prices.

We give below the prices of second hand machines offered for sale in the last issue of *The Motor Cycle* and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average, or to the lack of essential particulars in the advertisements, many advertisers making the fatal error of omitting the date of manufacture. The word "combination" indicates a sidecar outfit as supplied by the makers, while "sidecar" implies that the fitting has been carried out by the owner.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C.	1914	3½ 2-speed	—	£40
Abingdon	1914	5-6 3-sp. sidecar	—	£54
A.J.S.	1916	6 combination	—	£92
"	1914	6 combination	£75	£63
"	1916	4 combination	£65	£78
Allon	1916	2½ 2-speed	—	£32
"	1914	2½ 2-speed	—	£27
Ariel	1915	3½ 3-speed	—	£43
"	1914	5-6 combination	—	£50
Bat	1914	6 3-speed	—	£49
Bradbury	1914	4 2-sp. sidecar	£35	£41
Brough	1916	3½ 3-speed	—	£55
B.S.A.	1916	4½ sidecar	£66	£66
"	1915	4½ sidecar	£66	£55
Calthorpe	1916	2½ 2-speed	£30	£30
"	1915	2½ 2-speed	£27	£26
"	1916	2 2-stroke	£22	£29
Clyno	1915	2½ 2-stroke	—	£23
"	1914	6 combination	—	£66
Comnought	1915	2½ 2-stroke	—	£24
Douglas	1916	2½ 2-speed	£42	£45
"	1915	2½ 2-speed	£44	£42
"	1914	2½ 2-speed	£37	£37
Enfield	1916	6 combination	£82	£82
"	1915	6 combination	£71	£70
"	1916	3 2-speed	£50	£45
H.-Davidson	1916	7 combination	£87	£85
"	1915	7 combination	£65	£60
Henderson	1916	7 combination	£100	£100
Humber	1915	6 combination	—	£60
Indian	1916	5 combination	£69	£70
"	1916	7-9 combination	—	£84
"	1915	7-9 combination	—	£64
James	1916	4½ combination	£70	£70
"	1916	2-sp., 2-stroke	—	£31
Lea-Francis	1916	3½ 3-sp. sidecar	—	£63
"	1915	3½ 3-speed	—	£55
Levis	1916	2½ Popular	—	£26
"	1915	2½ Popular	£24	£20
Matchless	1915	7 combination	£82	£82
New Hudson	1916	2-sp., 2-stroke	—	£28
"	1916	4 combination	—	£60
New Imperial	1916	2½ 2-speed	£32	£32
"	1915	2½ 2-speed	£27	£26
Norton	1916	3½ 2-speed	—	£52
"	1915	3½ T.T.	—	£13
P. & M.	1915	3½ combination	—	£65
"	1914	3½ 2-speed	—	£50
Premier	1914	3½ 3-speed	—	£29
"	1914	3½ 3-speed	—	£47
Rover	1916	3½ 3-speed	£50	£52
Royal Ruby	1916	2½ 2-stroke	£24	£24
Rudge	1916	3½ Multi	—	£45
"	1915	3½ Multi	—	£38
Scott	1916	3½ combination	—	£60
Sun	1915	2½ 2-speed	£24	£20
Sunbeam	1916	8 combination	—	£100
"	1916	3½ sole	£73	£74
"	1915	3½ combination	£76	£75
Triumph	1916	2-sp., 2-stroke	—	£38
"	1915	4 countershaft	£50	£55
"	1915	2½ 2-sp., 2-stroke	£32	£25
Velocette	1915	2-sp., 2-stroke	—	£27
Zenith	1915	8 Gradua	£60	£60

HEAVY WORK FOR  
A TWO-STROKE.



**The National War Funds.**

At the week-end the principal war funds stood as follow:

The National Relief Fund (distributed £3,641,622) .. ..	£6,220,190	0	0
British Red Cross Fund .. ..	7,217,014	1	1
Tobacco Fund .. ..	135,594	0	0

**"The Motor Cycle" Index.**

We are requested by our publishers to announce that the index to *The Motor Cycle* for the six months ended June 30th, 1917, is now ready. Copies, price 3d. each, post free, may be obtained from the publishing offices of *The Motor Cycle*, 20, Tudor Street, London, E.C.4.

**Home-produced Petroleum.**

The Petroleum Bill, published during the week-end, gives the Government the sole right for getting petroleum in the United Kingdom. Any person obtaining petroleum without a licence would forfeit three times the value of the petroleum obtained. Parliament will pay for petroleum obtained on behalf of the Crown to a Special Petroleum Royalties Fund, and holders of licences will contribute £9 per ton. The Board of Trade may search for and get petroleum and grant licences.

It is a well-known fact that petroleum is obtainable in various parts of the United Kingdom, there being oilfields which have actually produced petrol for some years between Edinburgh and Glasgow, while in the west part of Norfolk there are also said to be other sources of petroleum. Unfortunately, these oilfields will not be permitted to produce any petrol for private purposes.

**British Imports and Exports for July.**

The importation of complete motor cycles has ceased completely, and a gradual reduction is taking place in the value of the parts and accessories which reach this country, this month's returns being reduced by £629 compared with June figures.

**IMPORTS FOR JULY.**

	1915	1916	1917
Number of motor cycles	495	253	—
Value of motor cycles, parts, tyres, accessories	£37,827	£27,234	£1,585

**BRITISH EXPORTS FOR JULY.**

There is a slight reduction as against June figures, but their value is well ahead of the July figures for 1915 and 1916.

	1915	1916	1917
Number of motor cycles	881	866	661
Value of motor cycles, parts, tyres, accessories	£64,601	£71,855	£73,437

**PETROL FIGURES.**

Number of gallons imported in July:

1915	1916	1917
15,458,600	11,526,000	12,346,846

The number of gallons imported during the seven months of this year was:

January .. ..	13,001,740
February .. ..	12,257,984
March .. ..	9,246,546
April .. ..	10,258,951
May .. ..	12,270,934
June .. ..	11,327,434
July .. ..	12,346,846

It will be noticed that close upon 1,000,000 gallons more were imported last month than in June.

**Petrol for Cigarette Lighters.**

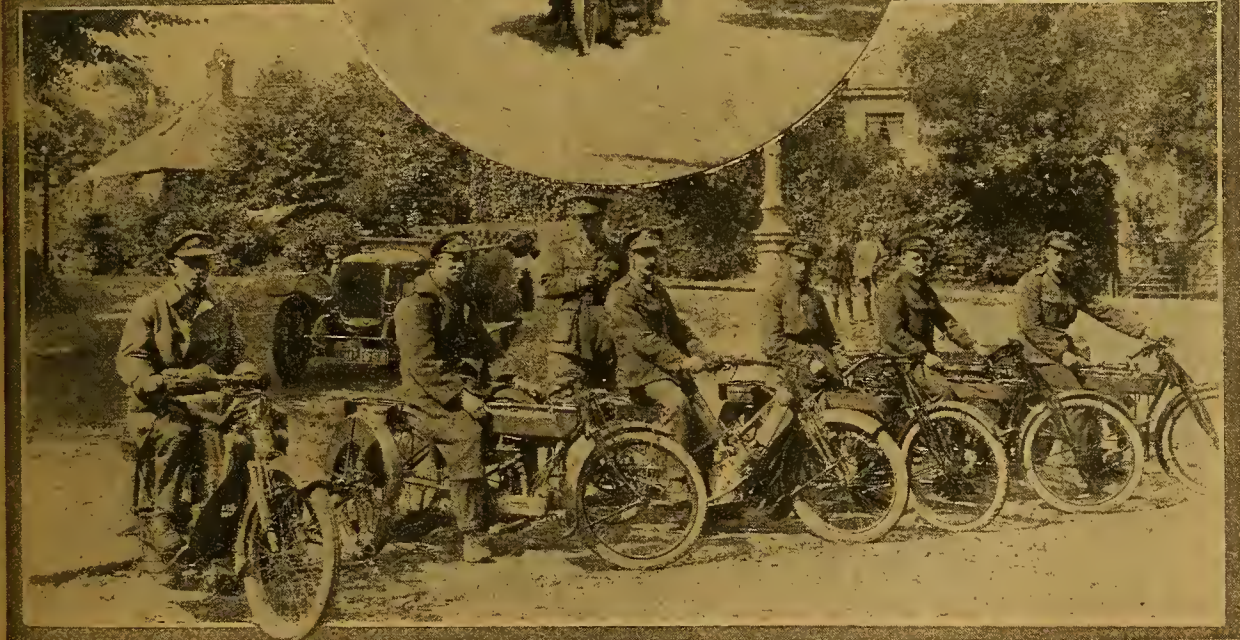
Last week two motor cyclists were standing by their machines, when a well-dressed man came up to them and asked if they would kindly fill a big cigarette lighter. Is this the latest dodge for obtaining petrol on which to run one's Auto-wheel?

**Water in the Petrol Tank.**

A D.R. in the Royal Flying Corps informs us that when he was last on leave he had an arrangement with the garage proprietor that when he asked for paraffin he meant petrol. This being a blind for the benefit of other would-be purchasers, who at the time happened to be in the garage, he suggests that this might explain the water in petrol tank mystery.

**New Tyre Repairing Works.**

Messrs. Harvey Frost and Co. have now centralised their tyre repairing workshops, and the departments at Great Eastern Street and Charing Cross Road have been transferred to their new premises in Great Portland Street.



FROM SCRAP HEAP TO COMPLETE MOTOR CYCLE (see next page).

(Top) The A.S.C. test hill. An unofficial trial; four up on a 4 h.p. Triumph.

(Bottom) A group of testers on the summit of the hill. In the background is the officer in charge, while in a line with the lamp-post is I. Oliphant, the well-known Premier rider.



# FROM SCRAP HEAP TO COMPLETE MOTOR CYCLE.

How War-time Wrecks are Rejuvenated.

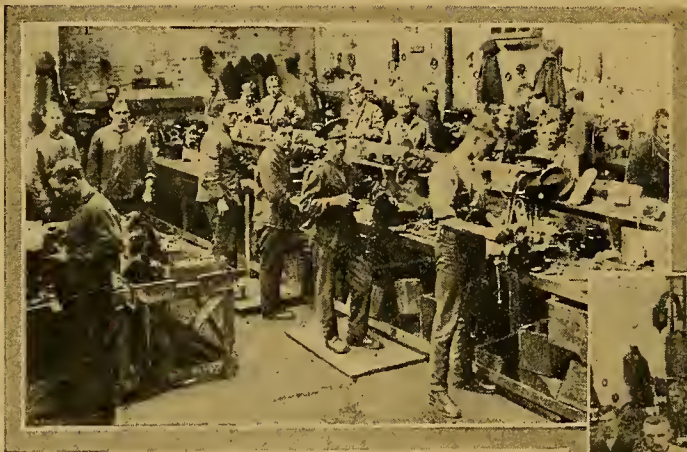
**N**OT many weeks ago one of our correspondents called our attention to a vast collection of derelict motor cycles, unprotected from the weather, and to all intents and purposes useless scrap, which was to be found in a field near a certain railway in the Metropolitan area. There were many wild speculations as to the ultimate fate of these poor wrecks. A rumour was started, and spread like wildfire, that they would be sold by auction, and words to that effect actually appeared in print (not in *The Motor Cycle*, we are glad to say), with the result that the unfortunate O.C. responsible for them was bombarded with letters and even visits from bargain-hunters. The outcome of all this was a tour round the depot and the interesting article and photographs which appeared in the issue of June 14th. Next we published a brief description of the depot to which all the new machines and those which have



A group of A.S.C. testers ascending the hill.

sent straight from the collecting depot to another, which is a well-organised motor cycle repair shop. It is as well to point out that when the machines arrive, mostly from abroad, they are in such an appalling condition that a few days or weeks more exposure can make little difference to them. Even if they were stood in the most luxurious sheds the process of oxidation would go on just the same, but now, possibly through the remarks concerning them which have appeared in the press, they are covered up with tarpaulins as a protection from the elements.

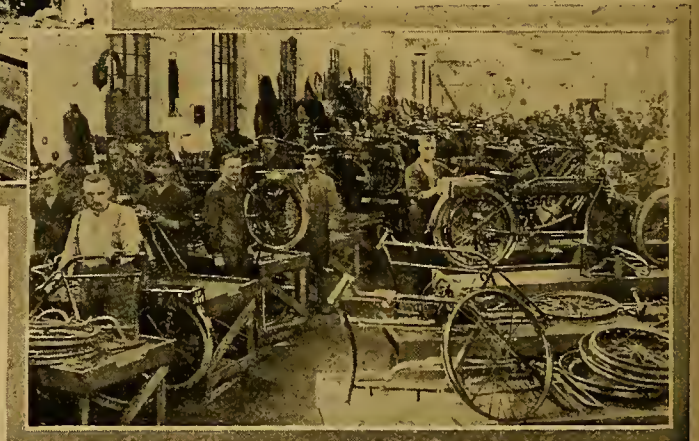
Our first article dealt with the terrible problems these bent, battered, and war-worn relics offered to the repairers, but the A.S.C. mechanics are skilled men, and the department, which is a building of considerable size, though barely large enough, is capable of turning out sixty finished machines a week. Nearly everything is done under one roof, but the side-car body building (who would have thought three



The engine repair shop

been repaired are sent and thence distributed to the various units, while now we propose to terminate the series by an account of the manner in which the machines are salvaged from the cauldron of war and made fit to serve their country again.

It will be seen from this account that in one branch of the Army at least business methods are employed, and there is no wastage. This hopeless tangle of machines is sorted out and



The frame shop where the machines are stripped and assembled and the frames repaired. The congested condition of the shop is clearly noticeable.



**From Scrap Heap to Complete Motor Cycle.—**

years ago that the Army would build its own sidecar bodies?) is carried out at another depot. The officer in charge is a keen motor cyclist and rides a  $3\frac{1}{2}$  h.p. twin James, and by the way we saw him threading his way through the traffic the other day we should say he is a driver of no mean skill.

This officer first took us to the stripping and erecting shop. At the moment both these operations are carried out under one roof, but they will shortly be separated. All the machines are placed on high benches, forty in number, so that the men can work at them comfortably. We noticed a Scott completely stripped, and a little further on a Triumph absolutely complete. It was hardly distinguishable from new, being stove-enamelled, while even the cylinder was blacked. Its fine condition marked it for work abroad, as those machines which are not quite in such good order are "for home service only." Near by was an ancient Zenith, also in process of renovation. Next we saw stacks of frames, repaired but waiting for engines and gear boxes, and among them, quite a curiosity in an Army repair depot, a Lea-Francis. Close by stood a row of machines which had been previously overhauled ready for testing. This depot has its staff of testers, and even its own test hill, of which more later. A little further on stood a row of motor bicycles which had been tested, but lay awaiting final adjustment before being sent away.

**Extending Use of the Military Sidecar.**

Our readers will remember the numerous Scott machine-gun outfits which appeared shortly after the war began, but few will realise that the buzzing Scotts one sees about London fitted with sidecars carrying coffin-like boxes are these identical machines. It is, nevertheless, a fact, and this depot makes a speciality of the conversion, and here are carried out the alteration of the frames and the building of the bodies. Not only are these frames fitted to Scott machines, but to other makes as well, and it is interesting to note that all the more powerful machines fitted with change-speed gears are now being equipped with sidecars.

In the A.S.C. Repair Depot nothing is wasted. In one group battered lamps are made like new, inflators which are damaged are similarly treated, while the Scott radiators are sent to the car repair department, and are there mended and tested under an air pressure of 10 lb. per square inch while the radiator is immersed in water, so that any sign of a leak is shown by bubbles. Skilled instrument makers see to the speedometers, and in one of the repair shops all types of magnetos are dealt with.

Our next visit was to the engine repair shop, one of the supervisors of which is Cpl. W. F. Newsome, the well-known Triumph rider. It was quite like old times to meet him again, and though he is just in his

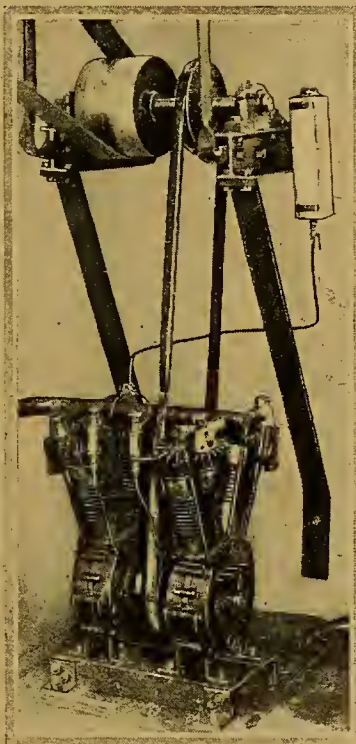
element, he told us that he would be glad to be riding in competitions once more. His former partner, R. R. Fletcher, joined the Public Schools Battalion at the beginning of the war, got a commission in the South Lancashires, and the last he heard of him was that he had been wounded in the neck in Mesopotamia.

**More Well-known Competition Riders.**

As regards the repair of engines, Newsome told us that there was an excellent system of checking in the department. When an engine is received, a corporal looks it over and details the repairs necessary and what new parts are required. If, for example, a crank case oil lug is broken, a new part is obtained and fitted, so as to save time, but the breakage is acetylene welded, so that it is finished and ready for the next machine of that make needing a similar repair. Splendid work was turned out by the men. Some did not know much when they arrived, but they soon learned and became skilful craftsmen. Men had been recruited from well-known firms in the trade — from Wauchopes, Maudes' Motor Mart, and various leading factories. The Staff-Sergeant was Jepson from Zeniths, who had raced at Brooklands; there was Oliphant, the well-known Premier rider, a tester; De la Hay, brother of the famous Sunbeam exponent; and Heath, another Sunbeam rider.

Many curious repairs have been effected. Some makers engaged on special Government work can supply no spares at all, not even to the Army, and it has been discovered that a New Hudson cylinder will fit a Premier, so such methods are followed to keep the home service machines in running order.

The next shop we went over was devoted entirely to gear box repairs, mostly carried out by mechanics from such firms as Sturmev-Archer, Ltd. One of the most interesting machines we saw in the shops was an ingenious air compressor made out of two 7 h.p. Indian engines placed side by side and



The air compressor made out of two 7 h.p. Indian engines.

with their main shafts coupled up. The exhaust valves were rendered automatic, and the air was drawn in through these and pushed out through special valves. A sleeve was inserted under each detachable head so as to increase the compression space, and longer holding-down bolts were employed. The two engines were so arranged that when the pistons in one were at the bottom of the stroke, those in the other were at the top. This compressor works six forges, and is so successful that another was being made like it at the time of our visit.

In another part of the building are a number of small rooms, each one of which contains the spares of one particular make. The largest stock belonged to Triumph machines, next came the Douglasses, 234 and 4 h.p., then Rudge, and so on. Makes of which comparatively few are used in the Army shared a room



### From Scrap Heap to Complete Motor Cycle.—

with others. There was also a general store for material, tools, etc. (no man can receive a new tool unless he produces the old one), and an equipment store, whence tool kits, lamps, pumps, horns, and other accessories were issued. Machines for use abroad are given new accessories, while those employed at home are equipped with those fittings which have been repaired in the other depot. Beneath the building is a cool cellar in which tyres and tubes are stored.

### The Official Test Hill.

There was one point which struck us very forcibly in the course of our visit to the works, and that was the fact that the shops seemed unnecessarily crowded. It is evident that the work has increased to such an extent that it could be done better in much larger premises. Altogether 250 hands are employed.

This article, we think, will convey to the average reader a good deal which is novel to him, and he will feel comforted to realise that in some departments of the Army efficiency is the order of the day, while waste is not only discountenanced but is actually non-existent.

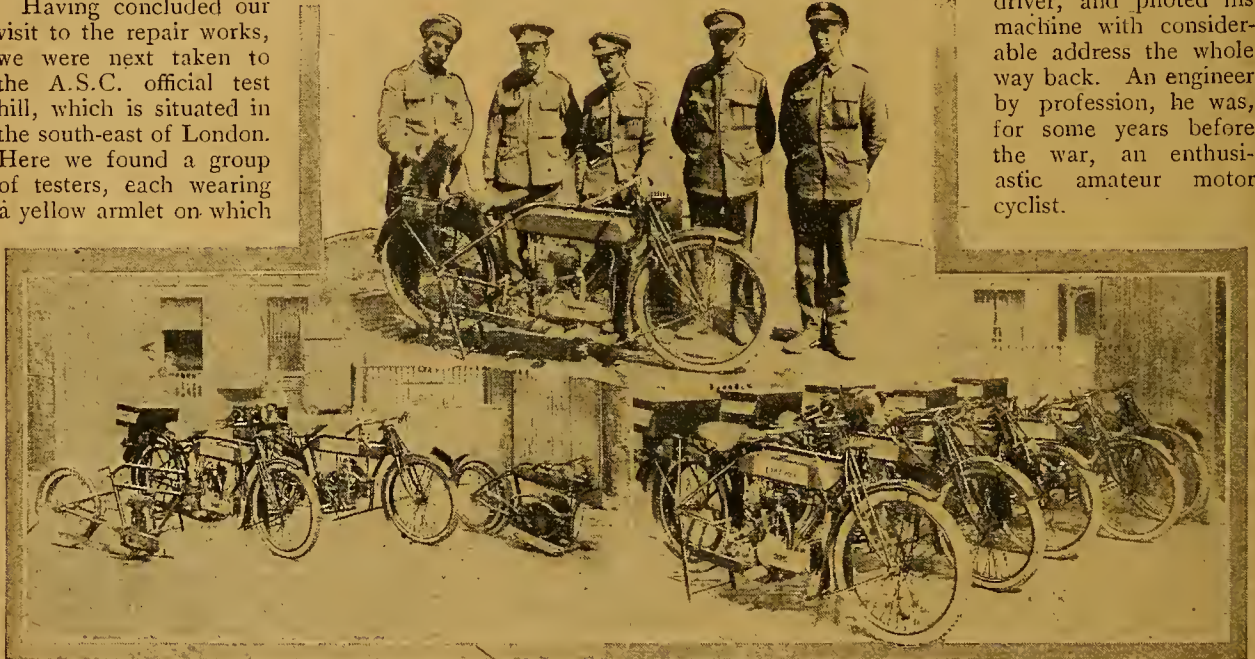
Having concluded our visit to the repair works, we were next taken to the A.S.C. official test hill, which is situated in the south-east of London. Here we found a group of testers, each wearing a yellow armlet on which

was the letter "T" in black, and among them we noticed the well-known competition rider, J. Oliphant, formerly with the Premier Cycle Co.

### A Rejuvenated Scott.

The hill is of considerable length, and has a maximum gradient of 1 in 8. All the machines were well tuned and made no bones about the climb. One interesting incident which we may mention was an unofficial trial carried out by four testers on one 4 h.p. Triumph (1 h.p. per man). Although so abnormally loaded that the back tyre was almost flat, the machine made a magnificent ascent. Among a group of motor cyclists who ascended the hill was the officer in charge of the repair works, driving a Scott sidecar combination. This was one of the old machine gun outfits which had seen service abroad. It had been done up in the repair works, and was pulling magnificently. After witnessing the demonstrations up the test hill we journeyed back to town in it. The machine ran with wonderful smoothness, and ascended Dog Kennel Hill on the way back on top gear at a remarkably good pace.

The officer in charge is certainly a most skilful driver, and piloted his machine with considerable address the whole way back. An engineer by profession, he was, for some years before the war, an enthusiastic amateur motor cyclist.



(Left) A Triumph and a Douglas before and after treatment at the repair works. (Right) A selection of motor cycles after being repaired at the depot. The Douglas and Triumph machines illustrated are all labelled "S.H., Overseas." This means to say that they are second-hand machines in good enough condition for Overseas work. (Inset) A group of well-known motor cyclists now in the A.S.C. working at one of their motor cycle repair depots. Reading from left to right: Pte. J. Oliphant (Premier), Cpl. W. F. Newsome (Triumph), Staff-Sgt. H. Jepson (Zenith), Pte. H. Langman (Scott), and Pte. T. Heath (Sunbeam). Oliphant is holding the corps mascot.

## TWO MEN AND A TANK.

**A** REMARKABLE story of a N.C. officer, private and a Tank is told in the list of awards published in the *Gazette*:

Pte. F. Brown (D.C.M.), accompanying an N.C.O., followed a Tank to its attack upon a hostile battery, keeping close behind. The Tank having fired a broadside the two men charged the position and captured a gun and its team. They then proceeded to attack another gunpit, when the N.C.O. was knocked senseless by a bomb. Pte. Brown

then carried on by himself and captured the gun team single-handed. He then attempted to mount a wounded horse and do further good work, but was unable to manage it, so returned to his company, whither the N.C.O. shortly followed him.

The non-com. was Cpl. H. Carter, and the official account stated that when he recovered consciousness he found that his companion had captured the team. "The dash and determination of these two men," it is stated, "were nothing short of marvellous."





## D.R.'S AND THEIR WORK.

(IN FOUR INSTALMENTS)

### PART III.—SUPERVISION.

By D.R.

D.R.'s and their machines and their work, and there is no such thing as "joy riding." D.R.'s are never allowed to use their machines for anything except actual official work, and it is almost impossible to get permission to use a motor cycle for one's own personal pleasure. D.R.'s are liable to be halted at any time by the military police and asked to produce some authority for their journey. They have regular set times to be on duty, off duty, or in billets, and these times must be strictly observed. Their machines are inspected thoroughly by men who know their job and who strafe any D.R. whose machine shows any sign of neglect or abuse. Of course, this is all as it should be to prevent waste of money in fuel, wear and tear, etc. But, on the other hand, in other parts a D.R. is practically his own master.

#### Inspection.

It is very necessary that motor bicycles should be inspected frequently to check any unnecessary wear and tear through carelessness, neglect, or abuse. This may be done by the officer in charge of the depot, if, indeed, there is such a person. In many cases motor cycles are stored in mechanical transport depots, and are then inspected periodically, say three or four times a year, by the Inspector of Mechanical Transport. This officer is generally very practical at his work, and makes a very thorough inspection of cars or lorries costing up to £1,000 or more, but he does not always attach much importance to the £50 or £60 motor bicycle. I have on two occasions seen an assistant travelling with the Inspector of Mechanical Transport specially to inspect motor bicycles, but neither of these assistants was exactly expert. This state of affairs is to be regretted, as the work of the inspectors is really important.

#### The Artificer.

This is another man for the wise D.R. to keep in with. He can do just what is expected of him in his capacity or he can do a lot more. He is generally an expert on motor cycles, and can frequently exchange useful "tips" with the more considerate type of D.R. But he is not the man to be "bounced" by the young knut type. If he is decently approached by anyone requiring advice as to how to obtain the best results out of his machine he will freely give the benefit of his experience, which is generally pretty considerable. If, however, the young knut tries to teach an artificer his job the result may be rather disagreeable—for the knut. He may have to wait rather a long time for any small repair to his machine,

and then find that the artificer has done no more than what was actually his job, when he might just as well have done this, that, or the other while he was at it. The artificer, of course, spends most of his time in the workshop, and is generally glad to have an opportunity of "testing" a machine after repairs or an overhaul. The considerate D.R. will not begrudge this little "testing" run, whether it is necessary or not, and, in return, he may find that his spare tube or spare belt or other *running* repairs (which are *not* artificers' work) have been properly attended to, and that all parts have been properly cleaned and oiled, and such little extras as mudshields, handle-bar muffs, etc., fitted.

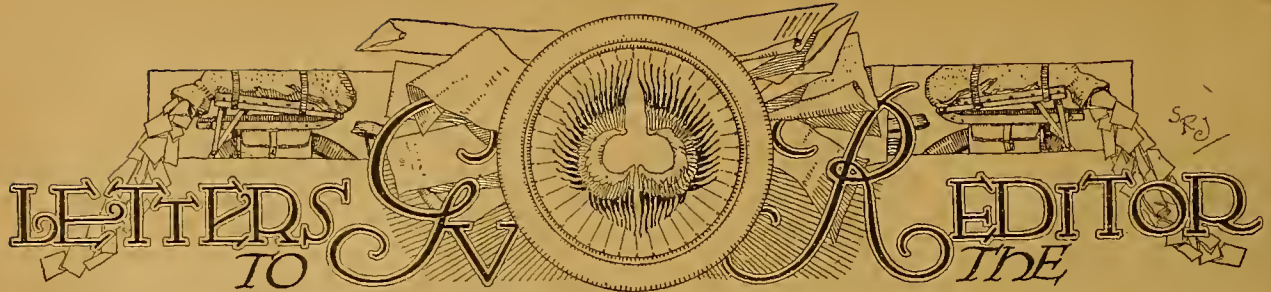
#### Repairs.

Repairs are of two kinds, viz., running and workshop, and sometimes it is rather hard to draw a line between the two. But usually any repairs that can be carried out on the road by means of tools and spares which are supposed to be carried on the machine are regarded as "running repairs," and should be done by the D.R. Other repairs, which require the use of heavier tools and perhaps greater skill and experience, are really "workshop repairs," and should be done by the artificer. Sometimes, however, a minor breakdown may occur quite near the workshop, when it is more convenient to push the machine a few hundred yards back to the garage than to effect the necessary repair on the roadside. In such a case the artificer can be very obliging when asked, "Would you mind repairing a puncture for me?" But he is not always quite polite when told, "This old 'bus wants a new exhaust valve fitting, and the belt is slipping."

Even in the workshop much patience and ingenuity have to be exercised, owing to the lack of sundry tools or materials, which have been borrowed or lost or never provided at all. It is quite pathetic to hear the remarks of an artificer when sawing through a large nut, using the point of an old scythe because someone has borrowed the workshop hacksaw!

There is frequently great trouble and loss of time in getting the very smallest requirements in the way of necessary small tools, etc. A requisition for a dozen assorted small files, value about 5s., may be returned with a chit asking why these are required. The reply goes back, "Because the old ones are narpooh." This brings a request for a full report from the N.C.O. in charge of the workshop as to how the articles in question had become unserviceable, and intimating that if the aforementioned articles were sent to so-and-so, accompanied by an Army Form No. so-and-so, duly completed, they would be placed before the next board, and, if considered necessary, they would be replaced in due course.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### WHY NOT ACETYLENE?

Sir,—I note with interest an idea put forward by "McAdam," Liverpool, in your issue of August 16th, regarding the utilisation of acetylene gas. A short time ago my petrol gave out when nearing my destination. A friend with me disconnected the tubing from the head lamp and pushed it well into the carburettor inlet. The car—an 8 h.p. Bedelia—ran to a garage, a matter of 300 to 400 yards. This may probably be a freak, but I am sure some of your many readers could relate a like experience.

PEDLAR.

#### BENZOLE AS A MOTOR FUEL.

Sir,—As a constant user and keen advocate of benzole before the war, I was very interested in the article by "L.A.S.," and can fully bear out all his statements regarding its utility as a motor fuel. The principal defect I experienced was the rapidity with which it attacked the tank enamel, and great care had to be taken when filling up unless a demonstration of its qualities as a paint solvent was desired.

The figures giving the comparison with petrol are interesting, but I should like to have the freezing points also. During a particularly cold period one winter I suffered from a frozen-up jet with benzole on two occasions, involving a considerable waste of time before the trouble was traced and remedied. This was the only real advantage I discovered petrol possessed at that time over the home-produced fuel.

F.E.S.

#### PETROL ECONOMY.

Sir,—Some time ago I applied for a permit to purchase petrol at the rate of two gallons per month for three months. In due course I received a reply from the Petrol Control Committee saying that on account of the present shortage they could not allow me this small quantity.

Can you tell me, through your valuable paper, how the proprietors of two well-known Scottish Sunday papers can get a supply of petrol to run motor cars from Aberdeen to Elgin and back *via* the Banffshire coast with their newspapers on a Sunday? I understand they have three cars doing this work for them.

In view of the present shortage, do you consider the carrying of newspapers by motor car on a Sunday an absolute necessity? If petrol can be allowed for work such as this, I do not see why business men cannot get a reasonable supply.

Surely something could be done to ensure that petrol, if granted, be used in work of national importance.

I might add that the route mentioned would be about 200 miles.

DISGUSTED.

Keith.

#### INVERTED CONTROL LEVERS.

Sir,—Capt. Lindsay hardly explains what I wanted to know, but he seems now to come down entirely to the question of the front brake lever being inverted. We will let it go at that. There is, however, a word I should like to say to him; if he read my letter correctly he would have noted that my remarks are not *ipso facto* that that which the manufacturer gives us must be right, but that the manufacturer, having the experience of what his customers tell him, decides that they prefer and find most use for the inverted lever.

In regard to his remarks *re* the certain type of machine and its brake levers, I have had a few of these machines through my hands in the last few years, and if he will sug-

gest to the riders that an occasional drop of oil and the occasional use of a rag to clean working parts a little will remove the trouble, he will no doubt do them a service: but he does not prove that *inverted levers are wrong* by saying what he does. I can give him a much better explanation of the brakes becoming inoperative. The fault is *not* the inverted lever, but another working part, and I think I am right in saying that experiments are being made to make the brakes work better; but I repeat, we are not concerned with non-working brakes, we started on the question, "Do inverted levers cause fatigue?" Capt. Lindsay said they did: I said they did not, and gave my proofs. It is up to Capt. Lindsay to prove they *do* cause fatigue. If they do not work, then I fail to see how he gets any fatigue at all from their use, because then he cannot use them.

(REV.) R. C. MEASURES.

Sir,—The various letters *re* "Inverted Control Levers" are very interesting, but I feel sure that if the people who condemn them had in the first place made sure that the wires did not foul anything, and had afterwards periodically greased the get-at-able parts, they would not have had much trouble with them.

Personally, I much prefer the inverted type: it seems easier to manipulate, the wires do not foul, and they look much neater. The hooking effect mentioned by several is an advantage, and, last but not least, one can always grab the lever first time and be sure of it. With other types one sometimes has to feel for the lever, owing, generally, to its having twisted itself on the bar.

Granted an outside wire is more easily renewed, but if the inverted is looked after it should last the machine out.

The chief trouble seems to be chafing wires and nipples shearing their solder. Manufacturers would do well to attempt to eliminate these defects, as, although they are minor details, they often cause great inconvenience.

Cpl. M.T., B.E.F.

OOJAH.

#### IXION, WHARFEDALE, AND THE FLAT TWIN.

Sir,—I did not intend to impose upon your tolerance again with regard to the above subject, but I will assure you that this is my final expression of opinion in the matter.

My intention is not "to raise any further obstacle in the progress of the flat twin," for I am full of contrition for my past misdeeds, but I should like to offer one or two suggestions on the subject of technical criticism.

Sound technical criticism should neither evade the point at issue under cover of humour or literary effect, nor should it involve too many side issues. For instance, does my position in civil life in any way influence the qualities of the type of engine under discussion? No? Well, then, why trouble either about it or my presumable ignorance of the "sweetness of the uses of advertisement"?

When I discuss engines I hate to be switched off, by way of Grecian mythology, into mid-Victorian verse. I cannot attune myself to the new atmosphere, and am consequently left behind.

Perhaps the chief reason why the ideas of "Ixon" and myself are thus diametrically opposed is that we are both cranks and both amateurs—he an expert journalist dabbling in automobilism, and I a plain mechanic dabbling in journalism. If I could possibly imagine a personal discussion between us, I think we should each begin to consider the other quite a decent sort of chap. The world must be the poorer, however, because of the impossibility of such a



meeting, for "Ixion" is "quite an opulent person," whilst I, alas! am merely a very insignificant person—doing my insignificant bit amongst several million more.

WHARFEDALE.

#### AVERAGE SPEED.

Sir,—I was very interested in "The Critics" on average speed. Thirty miles an hour take "some" doing on a long journey. Recently I went from Newcastle to Barrow, *via* Hexham, Whitfield, Alston, Penrith, and Kendal. I passed the Central Station at 10.20 a.m., and arrived at Penrith at 12.35 p.m.; left Penrith at 12.50, and arrived at Kendal at 1.35. Leaving Kendal, by a mistake I went through Milnthorpe, reaching Barrow-in-Furness at 3.20. The distance by speedometer was 128 miles. At no part of the journey was I asleep on the road, I can assure you. On the return journey I left Barrow at 9.30 a.m., and arrived at Penrith at 12.3 p.m. At Kendal the back tyre went down, and, on dismounting I found the valve rubber had gone. I replaced this with new, bought a reserve at a

G. T. Wilkinson and his 3½ h.p. N.U.T.-J.A.P., of which he speaks in the accompanying letter.



garage, and took the road through Carlisle, arriving at that place at 12.40 and Newcastle Central Station at 2.50. The distance by speedometer was 135 miles. Although I was travelling at forty miles an hour for the greater part of the journey, the average fell considerably below thirty miles an hour.

My mount is a 3½ h.p. N.U.T.-J.A.P., 1914. Since the enclosed photograph was taken I have removed the speed gears and put in a fixed back hub, gear 4½ to 1.

The machine ran well during the whole journey, and the back tyre valve rubber going was the only trouble I had. In all the total distance was 306 miles, and I used about three and a half gallons of petrol.

As I was passing a car on Shap a sheep bolted across the road, but by slightly swerving I avoided what might have been a nasty smash. As it was, its head hit the rear of my machine.

G. WILKINSON.

Sir,—I was much interested in reading the different letters on average speeds, and I should like to add my own experience.

The trip was undertaken three weeks ago from London to Ilfracombe, *via* Dorchester and Exeter—234 miles. The machine was a 1915 3½ h.p. Rudge-Multi, having myself on the saddle and a friend on the carrier. The luggage consisted of four gallons of petrol (one tin strapped on the tank), a Rudge front wheel, front fork, shackles, and silencer.

We started at 6.20 a.m., and arrived at 4.20 p.m., stopping more than one hour on the road for breakfast, lunch, and refills. Our running average, therefore, worked out at 26 m.p.h.—not bad considering the load.

Coming back, we were on two machines, both Ridges, and from Exeter averaged 38 m.p.h. for two hours. Night then compelled us to stop.

I might add that my motor cycle has done now about 24,009 miles, and runs perhaps better than ever. I cannot be convinced that, while machines such as these are still made, the flat twin can wipe the good old single off the market. Usual disclaimer.

A. BRESLAU.

#### COURTESY ON THE ROAD

Sir,—On Sunday, August 12th, my friend had a misfortune on the road five miles from Wolverhampton. Accompanying him were his wife and child. A gentleman, I believe from Tipton, riding a B.S.A. and sidecar, who had also two lady passengers, was going in the opposite direction, shedding his own passengers, and volunteered to take my friend's wife and child back to Wolverhampton, which he did. Also a gentleman on a Harley-Davidson offered assistance. I thank both the gentlemen through the medium of your paper.

B.O. 1195.

#### POLICE INTERFERENCE.

Sir,—In view of the inconvenience and irritation suffered by some of your correspondents at the hands of irresponsible officials on the question of "pleasure" motoring, I would suggest that you should have printed for sale cards bearing the following inscription, to be displayed in a prominent position on car or motor cycle:

#### NOTICE.

The petrol used in this motor has been issued by the authority and with the approval of H.M. Board of Trade (Petrol Control Department), under licence No. — of —, after prepayment of the full Excise duty, for use at the absolute discretion of the owner.

If everyone concerned carried such a notice I think we should have little further trouble.

H. A. BROMLEY.

#### HEATED CRANK CASE.

Sir,—I read your correspondence and questions and replies. Your friends often complain of hot crank cases. I have not seen it suggested that tight main bearings or badly aligned shafts may account for this.

But in my own experience with an engine whose crank case got hot—too hot to sit on—in less than four miles, and absolutely stopped, the trouble was traced to the extra tight fit of the main ball bearings in the aluminium housings.

This engine puzzled the testers for weeks. It was tried on the road so often that the belt and saddle showed heavy signs of wear. We used to call it "Our friend the dud." When the bearing housings were freed it would run anywhere, cool as a cucumber, and stand high gear splendidly.

Now for the reason. The standard diameter of the housing was determined to suit the F. and S. ball bearings, which have a substantial outer case. But Skefko bearings which have a double swivelling case of same diameter were fitted, hence much weaker—so that a housing which was merely a force fit on F. and S. jammed the balls on Skefko.

This was the most obvious example I ever tackled, but the same treatment has cured many others. In fact, the best reply to the old wheeze "What makes an engine konk?" seems to be "Tight main bearings."

It is most difficult to detect overload of ball bearings by hand. It only shows up at high revolutions; hence a loose fit is to be preferred.

TITUS.

#### SIDECAR CONSTRUCTION.

Sir,—I should like to point out to your readers that to my mind the streamline sidecar suggested by your corre-



The Winson sporting type of sidecar referred to by G. Whiteley.

spondents is already on the market, viz., the "Sporting Winson." This model covers nearly, if not all, the points raised—streamline, sporting, well sprung, comfortable, and very roomy. The Winson tail is also equipped with a large locker, which enables one to carry a full tin of petrol, tools, etc. I have no connection with the makers, but write as a very satisfied rider for four years.

GEO. E. WHITELEY.



### ACTION AND REACTION ARE EQUAL AND OPPOSITE.

Sir,—Perhaps the following will make it clear to Mr. T. Rae that "Mohandis" was quite correct in his statement that "the road exerts an equal and opposite reaction on the tyre" (provided the wheel does not skid).

The wheel may be looked upon to consist of an infinite number of levers, each having the point of contact as the fulcrum, and coming into action in turn.

In the sketch,

AB=Radius of belt rim.

BC=Radius of driving wheel.

B=Hub.

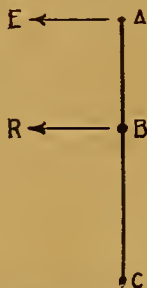
C=Point of contact.

E=Effort of engine.

R=Resistance to motion of machine.

Now, if  $(E \times AC) = (R \times BC)$ , an equilibrium results, and the machine is at rest.

But if  $(E \times AC)$  is greater than  $(R \times BC)$ , the resistance (R) is overcome, and motion is transmitted to the machine via the hub (B). A.G.M.



Sketch illustrating A.G.M.'s remarks.

### ROADS AND ROAD TAXATION.

Sir,—I note in *The Motor Cycle* of August 2nd you devoted a short article to the question of concrete roads, and the growing necessity for long-delayed repairs to many which have badly deteriorated since the war began.

What I would like to urge is that, before any extensive repairs are commenced, involving a considerable expenditure, steps should be taken, and without delay, to render liable for road tax all motors or mechanically propelled vehicles. I believe I am correct in stating that the Motor Car Act of 19— took no cognisance of motors for commercial purposes, as they were at the time more or less in their infancy. Since then there has been an enormous increase, ranging from the ponderous char-à-banc and motor 'bus down to the tradesman's light delivery van. All these, I understand, are running untaxed both for roads and petrol—in other words, causing the bulk of the wear and tear and contributing nothing towards making it good.

The present Motor Act should be cancelled as out of date, and a new one passed, providing for the taxation of all motors using public roads. The present method of rating by engine power is open to much objection, and might with advantage be abolished in favour of making weight (car, etc.) the basis for arriving at a proper and reasonable amount of taxation. Motor cycles should be rated according to their value, with a fixed maximum, thus doing away with the manifest absurdity whereby an auto-wheel pays as much as an 8 h.p. twin machine. After the war there should be a combined effort made by all the private motoring organisations, from the R.A.C. downwards, also all road authorities, to bring about the inclusion of that class of motors at present exempt from road taxes.

In Ireland, with its scanty railway system and comparatively few trains, the motor lorry or waggon has been largely adopted between the industrial centres and outlying towns, by reason of the great saving of time and less handling of goods conveyed, the result being the main roads have suffered extensively of late years, and on some roads, owing to inferior material, any improvement effected by steam rolling is of short duration, and barely worth the expense; yet these 3 and 5 ton vehicles, unless I am utterly misinformed, pay nothing in compensation for the damage they do. Personally, I approve of and willingly pay my road tax, but it is certainly a rank injustice that the burden of taxation should not be shared by all alike.

Trusting my views may meet with the approval of your readers, and elicit their opinions and suggestions.

Belfast.

R. G. LINDSAY.

### THE POST-WAR SIDECAR.

Sir,—As a family man I have a natural interest in post-war sidecar machines, and, not being overburdened with this world's goods, wish something not too expensive or luxurious, but capable of hard and sustained service. To meet these requirements I would suggest a specification as follows:

Engine, single-cylinder 550 c.c. water-cooled, with radiator and water jacket combined as in the Green-Precision (but preferably not with both valves overhead), an outside flywheel, and gear box forming an integral part of the crank

case. The gear box should be in front, so that advantage may be taken of the longer belt-drive thus afforded, and there should also be the necessary reduction between engine and gear box to enable a large pulley to be used. The magneto, being ousted from its usual position, would be placed in rear of the cylinder, which is the better place from the point of view of protection. The engine pulley should be on the right-hand side, so that the belt is easily accessible, and the outside flywheel between the engine and sidecar, and so well protected.

The combination of water-cooling, outside flywheel, and long belt drive should make for a sturdy and smooth-pulling engine.

JOHN V. L. HALL, Lt. R.F.C.

Sir,—Surely many cases of unfair allowances of petrol, made through the existing system of distribution, whereby petrol licences are issued by one office in London, could be remedied if riders were granted their petrol cards by the same local authorities from whom they now obtain their driving licences. If this course were adopted, no doubt it would be easier for those who were entitled to a reasonable allowance for important business use to convince these people (who would already know the applicant and his affairs) in a personal interview than in many weeks of correspondence.

Your article on "Design of Four-cylinder Motor Cycle Engines" is interesting to one who has sampled every type of motor from 1½ h.p. Minerva upwards, and I for one am firmly convinced that there is a future for someone who can place a four-cylinder combination on the market to the following specification for about £65: Engine, 10 h.p. *monobloc*, two speeds, shaft drive, Scott radiator; the whole built in one unit, i.e., sidecar, chassis, and cycle; the power unit and gears fashioned after the Ford car principle; the chassis on car lines, and without any forks and stays to surround the wheels. We could then have real detachable wheels, and a serviceable all-weather combination which could be cleaned with a hose if necessary.

Our makers must break away from the conventional design before finality in design can be reached, and build us a complete machine instead of assembling an accumulation of other people's specialities. We must not lag behind our American competitors, as we shall want a real motor cycle for the million (not the millionaire) as soon as hostilities cease.

Cottingham.

FORSYL.

### WHO SHOULD HOLD DRIVING LICENCES?

Sir,—I have been greatly interested in the correspondence in *The Motor Cycle* re granting licences to persons who have partially lost certain of their faculties, especially those who are minus the vision of one eye.

With regard to my own case, I may say that, owing to an accident during childhood, I was deprived of the sight of the left eye. Of those early years I can give very little information as regards my sight, but during the last seven years before joining the Army, I had been an enthusiastic motor cyclist, and had ridden machines bearing the names of most of the well-known makers, and during that time had only had one accident, and that through no fault of my eyes, but through another person's carelessness and neglect of the rules of the road.

My right eye is slightly myopic, but that is corrected with glasses.

I believe I am right in saying, and I have the information from a qualified optician, that when the sight is lost from one eye, the other, in most cases, if in a healthy condition, will automatically adjust itself in time, and that the person afflicted will be almost as good a judge of distance from one point to another as those more fortunate individuals who possess sight in both eyes and can obtain a true stereoscopic effect, and certain of whom wish to deprive such people as myself of one of the greatest pleasures in life.

During my riding experience I have had some very narrow escapes, and saved myself solely by estimating distance, which must have been somewhere near correct, otherwise I should not be alive to-day.

I certainly hope therefore that the authorities will not deprive people similarly afflicted as myself of the privilege and pleasures of motoring when things settle once more to their normal conditions, provided they can prove their driving capabilities. I hope this letter will reach you ere this discussion is entirely forgotten.

Salonica. (PTE.) EDGAR G. WATKINS, R.A.M.C.



# THE Critic

## Fireside Chats on Motor Cycle Problems

### POWER versus WEIGHT.

"I AM looking forward to seeing what sort of an impression the big American twins make among our D.R.'s in France," the Manufacturer said, thoughtfully. "It will be particularly interesting to note how they compare with the popular British type during the winter months, and it is really a mighty important matter. The war is the competition world of to-day, and if before very long everyone is talking about the suitability of the big American machines out there, it will have a great effect on our Overseas market."

"The machine that will do well in France will doubtless do well in the Colonies," agreed the Journalist, "but I do not think that it follows that the best machine for France is also the best machine for the Colonies."

The D.R. also held this view. He said that in his opinion the  $3\frac{1}{2}$  h.p. single is the best machine for France, but he would prefer the big twin for the Colonies; while the Novice pointed out that from his point of view the most important point on which the big twin scored for Colonial use was in its universal adaptability. "A standard type of sidecar can be hitched to it at a moment's notice, thus widening its sphere of usefulness," he pointed out, "but this does not apply to Army work."

"It certainly would not apply to war work," announced the D.R. "Despatch riders don't want sidecars, and machine gun men and the commissariat departments don't want solo mounts. There is no object in hauling a needlessly heavy and hungry mount over thousands of miles solo because someone may some day wish to attach a sidecar to it. Mind you, I do not wish to depreciate the big American machine, which is a type of mount I favour."

"Well, I do not," stated the Manufacturer. "It is all right when one is in the saddle, but there are times when one has to handle the machine out of the saddle. It is then an unwieldy burden."

"That has never bothered me," said the D.R. "If you old fogeys will push your machines about instead of straddling them, you can't blame the machines because you don't like it. I know that the opinion of the average British rider is that the big American is difficult to handle, but if this were so, how would it be possible for the Americans themselves to accomplish such marvellous overland records? Look at Bedell's record from Los Angeles to New York—3,276 miles in 7 days 16 hours, partly over appalling country! Unless the American machines were cut out for such work, how could it be possible?"

"For such records I agree that you must have high power," replied the Journalist. "It would be impossible to maintain a high average over rough country without it; impossible, too, if the engine were overworked throughout the journey. But this in no way satisfies anyone that the type of machine is suited to the requirements of the everyday rider amidst such conditions."

"But it proves this," quickly retorted the D.R.—"that the machine was not exhausting to ride. You know as well as I do that a record of this sort is a record of human endurance as much as anything, which shows conclusively that the handling of big solo mounts is chiefly a matter of knack."

#### The Elderly Rider.

"There appears to be some sense in that," the Journalist admitted; "but, look here, I have ridden these big machines abroad and in the most strenuous competitions at home. I have ridden them through swamps and along the beds of rivers, and I can assure you that under such conditions I have felt a very real desire for something light and low geared."

"And so have I," agreed the Manufacturer. "One must bear in mind that not all motor cyclists are of the despatch rider order—young, perfectly fit, practically living on their machines. That type of man naturally loves a big twin, but the opinions of despatch riders must not entirely rule the roast."

"But his opinion will carry big weight in the Colonies," pointed out the D.R., "because there a machine is regarded solely as a business proposition. There is little pleasure riding done, and the only choice in the matter is between the big twin and the light four-wheeler. The elderly rider chooses the car every time, and so need not be considered."

#### What about Wheel Slip?

"Suppose we discuss the actual machines?" suggested the Journalist. "There is no doubt that the big engine scores tremendously when it comes to cases of plugging through deep sand on an up grade or through heavy mud. It can do this at quite a normal load, whereas the  $3\frac{1}{2}$  h.p. is very fully loaded under such conditions, and therefore more likely to give trouble. That is where the big engine scores, but no one loves it for its weight. You get one of these big Americans properly bogged amidst really Colonial conditions, the engine firmly jammed against the ground, and you jolly soon revise your ideas as to the suitability of heavyweights for such work."

"Hear, hear!" muttered the Manufacturer. "I have never quite seen the object of these huge engines for regions where the speed at which one travels is entirely governed by the condition of the roads. On our roads there is some fun to be had with a powerful twin, but in countries where the roads are of the pioneer order it seems to me that one is burdening oneself with an unnecessary weight of machinery to drag through the swamps. With a British  $3\frac{1}{2}$  h.p. machine you have power enough to propel the wheel anywhere that wheel grip is possible. When the wheel begins to spin it doesn't matter a straw whether you have  $3\frac{1}{2}$  b.p. or 9 h.p.—in fact the light machine stands the better chance of extracting itself."

"Not if it be provided with 26in. wheels and the twin with 28in.," argued the D.R. "Now just listen to this. I once took part in a moorland trial—river beds, peat swamps, etc. I tried to get round in advance on a lightweight machine, but though I had power in hand I was bogged at every swamp, and it took me three and a half hours to do twenty-eight miles. The little machine simply had not the weight and mud-plugging capabilities to carry it through. On the day of the trial I rode a heavy  $3\frac{1}{2}$  h.p. chain-driven single, and got cleanly through all the swamps—simply ploughed straight across them by sheer momentum. This shows that weight is at any rate of some advantage when the conditions are really bad."

"Now—wait a minute, I've not done yet. I'll tell you another point on which the big low compression slow-running American engine scores. You can throttle it down till it just ticks over, delivering an even driving motion to the rear wheel, almost irresistibly. It will keep on ticking over like that as long as you like, and you can walk alongside, allowing the rear wheel to spin in the mud if it wants to."

"That is purely a matter of flywheel weight and a pilot jet," pointed out the Journalist. "And you can do exactly the same thing with a British single. Personally, I have found that a good British single with its hand-controlled clutch is infinitely preferable to the big American twin when it comes to wallowing alongside with the engine just ticking over."

"Of course, you can," supplemented the Manufacturer. "All you want for that kind of work is a heavy flywheel, a decent carburetter, and a handle-bar clutch."

"Do you not think," modestly interposed the Novice, "that it is not so



### The Critics.—

much the big engines of American machines which specially appeal to Overseas riders, but the other points of design—sufficient ground clearance, large wheels and tyres, positive drive, loop frame, and a machine which is not abnormally heavy for its power? Then, again, the matter of price is the most important factor of all. My opinion is that if one could buy a popular Yank with, say, a Triumph or Sunbeam engine stuck in the frame, it would sell better Overseas than the present Yank with a Yankee twin engine. Find me a pipe cleaner."

But the D.R. still shook his head. "The Americans do not stick on an

extra cylinder just for the fun of the thing," he said. "It is difficult to describe how truly abominable the roads really are in some unsettled portions of the world. One must have a slow-running engine with a big reserve of power—an engine which will stick it for hours. I have ridden a  $3\frac{1}{2}$  h.p. single—one of the best—in Canada, and I tell you that I have met conditions so vile that it was necessary to get off and let the engine cool every other mile. That was a modern three-speed machine, and on a big two-speed American I have made the same journey without trouble."

"What about France?" queried the Journalist. "What would you have said had they rigged you out with big twins?"

The D.R. thought a moment. "We could have done with the extra cylinder so far as more power and improved torque were concerned," he finally acknowledged, "but we did not want the extra weight."

"Did you think the extra power and improved torque would have been worth the extra weight?" demanded the Manufacturer.

Again the D.R. pondered, but this time the question went unanswered, for at that moment a happy diversion was caused by the Novice, who, having failed to induce the cushion to yield a feather, was attempting to stuff the end of the ornamental blind cord down the stem of his pipe.



### THE COUNTRY DOCTOR.

It is hardly probable that doctors will suffer by a curtailment of their petrol supplies, but should an unlikely thing happen, many who now run cars will turn to the sidecar, just as the country practitioner in the photograph has done. Besides consuming less petrol there is the greater likelihood of repairs being more easily performed at home than would be the case with a car—an advantage in these days of labour shortage. Incidentally, the fourteenth century court house depicted has great historical interest. It is situated at Long Crendon, near Thame, Bucks. Here Walter Beauchamp, the Great Steward of Queen Catherine, Consort of Henry V., held courts from the first to the eighteenth year of the reign of Henry VI.

## How Manufacturers are Imposed Upon.

ON a recent occasion Mr. W. H. Wells (The Hendee Manufacturing Co., Ltd.) showed us a glaring instance illustrating the manner in which unscrupulous people often impose upon manufacturers by attempting to get defective goods replaced free of charge. In this case the culprit reported to the company an accident which happened to his machine, a 1915 5 h.p. Indian, fitted with a light sidecar and ridden by his son. While travelling at a slow speed the front down tube and lower horizontal tube broke, with the result that the machine was overturned. In a letter to the firm he expressed his surprise at the accident having happened, especially as the machine had had very little use, and had never been subjected to anything that would cause extra strain. In consequence of this letter the company suggested that the machine should be stripped and the frame sent to them for inspection.

On its arrival we were invited to go and see it, and found that the breakages

were as stated in the customer's letter, but, far from the machine having had very little use, it had been subjected to all sorts of unfair strains. It had evidently been broken before at the places mentioned, and had been brazed, while there were traces of the points fractured having been exposed to enormous heat. Moreover, the previous repair marks were clearly shown, indicating where the frame had been touched up with red paint, which showed clearly, distinctive from the standard enamelled colour.

#### Asking too Much.

The owner had no evidence of the amount of use to which the machine had been subjected, as he did not even know from what agent it was bought, nor the date. He merely had watched the way in which it was treated during the time that it was in the possession of a friend of his, and previous to that date, of course, he knew nothing about it. In one of his last letters he states that he

was surprised that a company with such a name should be unable to replace the frame, the tubes of which, in his opinion, were remarkably thin. Having personally inspected the breakage ourselves, we would say that the tubes are, on the contrary, of ample thickness and stability. To expect makers' guarantees to hold good indefinitely is asking too much.

### IMPORTANT NOTICE.

#### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of the envelope, and should be kept distinct from questions bearing on technical subjects.

## Oil-proof Plug Wanted.

I am constantly troubled with the sparking plug of my two-stroke oiling up. I use a two-point plug with heavy electrodes. —J.H.

Bend one of the points away from the centre electrode, so that it sparks across one gap only. Try using less oil. The best type of plug would be one having fine platinum wire points.

## For Sidecar Use.

I have bought a 6 h.p. twin Rex with automatic inlet valves. Would you kindly let me know if it is powerful enough to take a sidecar with a N.S.U. gear fitted to it? It has a Roc handle starter also. The engine is in very good order, and a Binks 1917 carburetter is fitted.—F.C.

If the engine is in really good condition the machine should easily take a sidecar in normally level country, but with an old engine everything, of course, depends upon the care, or otherwise, with which it has been used. The only way to form an opinion as to whether or not the machine will take a sidecar is by trial on the road.

## Four-stroking.

Can you give me any information as to how to eradicate the four-stroking of a 2½ h.p. two-speed, two-stroke, fixed gear motor cycle fitted with an Amac carburetter, bought new in 1916? The four-stroking occurs at speeds of 20 m.p.h. and under. The jet used is No. 26, as put in by the makers. Even with the air full open it is no better than in any other position. The crank case is air-tight, and so are all the joints. The plug, jet, and carburetter are clean. The four-stroking occurs on the level, and disappears on slight grades. Over 20 m.p.h. the machine two-strokes with regularity on the level as well as up hills. I have tried a larger and a smaller jet, but with worse results, if anything. The machine has only done about five hundred miles up to the present. Any help to cure this trouble will be very gratefully accepted.—H.W.B.

The trouble of which you complain is very hard to cure. It may often be improved by fitting a smaller jet and hot air intake. The fact that the engine will take in air all the time seems to indicate that the mixture is too rich. Over-oiling also will cause four-stroking. The trouble will probably diminish after the machine has been running a little longer.

## Use of Foot Brake.

Does it harm a motor cycle in any way to put on the foot brake slightly when rounding a corner, instead of raising the exhaust valve, as my 2½ h.p. motor cycle does not gather speed again quickly after lifting the exhaust?—F.V.C.B.

The correct way is to throttle down when using the foot brake, not to use the latter against the power of the engine. This would cause excessive wear of the brake block or lining; otherwise no harm would be done. Do not control by means of the exhaust lifter, but by manipulation of the throttle.

## Fitting Disc Wheels.

(1.) I have a 1914 T.T. Scott machine, and propose fitting disc wheels to it. Will this affect the steering at all? (2.) Can you suggest any suitable type of vaporiser for this machine? I have a Binks carburetter. (3.) Do you consider that a 250 miles run (from London to South Wales) would be too far to go in one day?—J.D.

(1.) The fitting of disc wheels to your machine will not affect the steering, except perhaps in a very strong cross wind. (2.) No special vaporiser would be necessary if you fit a thoroughly efficient hot air intake. This can be done by carrying a brass or copper pipe through the silencer and continuing it upwards to the carburetter. (3.) 250 miles in a day is a long run, but if you start early in the morning it can be done without hardship.



Mr. J. Muscat, proprietor of the *Malta Herald*, about to start on a shooting expedition. He says that motor cycling is on the increase in the isle of Malta—or "Flor del Monda" (the flower of the world), as the natives call our Mediterranean Possession.

## Petrol Consumption.

I am a constant reader of your paper, and continually come across letters therein telling of extraordinary miles per gallon on various makes of machines. I own a 1916 Royal Enfield combination, 6 h.p. twin, and am doing 125 miles to a tank of petrol, i.e., two gallons less one pint. I wish to ask if you will kindly inform me whether this is fair. If not, how can I improve on it?—C.L.D.

If you are getting approximately 60 m.p.g. with the outfit fully loaded you have nothing to complain about, and we doubt whether you will be able to improve very much upon this. It is possible for a good tuner to obtain higher results, but it is more a matter of individual judgment and a combination of small points that it is due to hard and fast rules.

## Misfiring.

I have a 2½ h.p. 1911 Douglas, fitted with automatic inlet valves. My trouble is misfiring in the rear cylinder, and I am unable to climb the slightest gradient on top gear, and am also suffering from excessive fuel consumption. I have changed over the inlet valves, and also the plugs, and fitted new piston rings, but still the trouble is confined to the rear cylinder. I am running on naphtha, and have a hot air pipe from the cylinder to the carburetter, and also a gauze in the intake. I used to get good results until lately. I should be glad if you would help me to locate the trouble.—W.B.T.

We should recommend you to check the tappet clearances and lift thoroughly in the case of all four valves, and, if you find these clearances are correct, fit a stronger exhaust valve spring. It seems to us most likely that the tappet of the exhaust valve in the rear cylinder is in need of adjustment. You might also look to the carbon brush of the cylinder which is misfiring, and try the spark at this cylinder by running the engine on the other cylinder with the back plug resting on some metal portion of the frame. If the spark is intermittent, you will know the ignition is to blame. Make sure the back valve is not periodically gummed up with oil by over-lubrication. A certain amount of trouble must be expected when running this type of engine on heavy fuel, the automatic inlet valves permitting certain fluctuation in the charge.



### A Matter of Choice.

**?** (1.) What is the speed capability of the 4 h.p. Douglas when tuned up and riding solo? (2.) Would the 2½ h.p. Douglas be suitable for a journey, say, from London to Newcastle? (3.) Which of the above two is the better solo mount?—K.P.

(1.) Speed capabilities are dependent upon engine tune. If adjusted for racing, it is possible to get a maximum speed of somewhere between sixty and seventy miles an hour on the track with a 4 h.p. engine, and very nearly the same speed on the road. (2.) Quite suitable. (3.) This is purely a matter of taste. The 4 h.p. is, of course, faster and more powerful, and probably preferable for very long journeys.

### Improving Consumption of Old Machine.

**?** Will you let me know if it would be of any advantage to me if I fitted an up-to-date carburettor on a 1912 Triumph? The machine runs very well, but is not very economical. It is a 3½ h.p. fixed engine.—J.W.S.

As you would experience considerable difficulty in obtaining an up-to-date carburettor, and the improvement you would make on the original 1912 model would be very small, we should not recommend you to make any alteration. You can tune up the engine and carburettor to be quite equal in economy by experimenting with the size of the jet and choke tube. Also make sure the slides are not excessively worn. If worn, it would be better to renew them.

### Almost a Mystery.

**?** My mount—a 4 h.p. twin Precision engine, side-by-side valves, Bosch magneto—is an exceedingly fast machine, and ran well till recently, when without any alteration to anything it suddenly struck work, and has never run since except on the front cylinder, which fires strongly. I have taken down the engine, cleaned the carburettor and magneto, but no improvement. Compression on both cylinders is good, rings not sticking, valves opening correctly at the right time and not sticking, valve lifter free when running, carburettor (B. and B.) clean, no air leaks, jet correct size. Gas is reaching the back cylinder, but exhausted into the silencer unexploded. Silencer pipe removed altogether and the engine has been tested at all throttle and spark positions. Sparking plugs in order—six makes tried. Magneto and valves are both timed correctly and working properly; carbon brushes not sticking and clean; points the correct break; high-tension wire not shorting.—A.D.

It is very difficult to suggest a possible cause of the trouble, as you seem to have checked everything. We suppose you have made sure that a spark is actually occurring at the plug points of the back cylinder? If not, you had better do so; you may have a broken high-tension wire. Examine the valves and valve guides for leakage, and look out for cracks in any part of the engine. Make sure there is no impediment in the induction pipe,

and also that the carburettor slides have not moved their position. Examine magneto thoroughly, looking out for loose, cracked, or broken parts—especially carbon brushes. Make sure that tappets are correctly adjusted.

### Worn Pulley.

**?** I have a Zenith gradua gear. The belt begins to tighten when down as far as it will go (very tight), but when on high gear the belt is very slack. What is the cause of this?

The probable cause of the tight belt on low gear and slack belt on high gear is that the machine has been ridden mostly on high gear, which has worn the pulley flanges, so that the belt tends to drop deeper into the groove on high gear. Thus it is robbed of its full range of action.

### Tyre Trouble.

**?** (1.) Would a Grado heating jacket fitted to Senspray carburettor be sufficient for running on substitute or paraffin (after starting on petrol)? The machine is a 1912 3½ h.p. B.S.A. (2.) I recently fitted a new 26in. x 2½in. extra heavy Dunlop outer cover and a new (same size) Michelin butt-ended inner tube. The inner tube on several occasions has burst. The same thing happened to the last inner tube. The spokes do not appear to project too far. Can you suggest a reason? The inner tube seems to be too long. Would it get pinched if it overlapped anywhere? The tyre is on the rear wheel.—C.B.M.

(1.) The Grado vaporiser should be quite suitable for this purpose. A hot-air intake in addition would assist. (2.) Yes, if the inner tube is not a good fit in the cover, it is naturally liable to get pinched. Try an inner tube of the same make as the cover, and see that the butt end is properly fitted together, with plenty of French chalk.

### Hot Crank Case.

**?** I have an Ivy four-stroke motor cycle fitted with a J.A.P. engine, and frequently at the end of quite a short run I find the crank case exceedingly hot—too hot to hold one's hand against. My dealer tells me that this may very likely be caused by the impure quality of the petrol now supplied, and I was wondering if this might be the case. If so, is it doing any harm to the engine to go on running while the crank case is in this state, and can anything be done to stop it?—G.R.R.

The heating of the crank case is probably owing to leakage past the piston rings. If the engine pulls well and does not consume an exorbitant quantity of oil there is no need to trouble about it, though the defect will probably cause a rapid accumulation of carbon inside the piston. New piston rings would no doubt remedy it. It may also be due to conductivity, in which case the fitting of an asbestos washer between the cylinder and the crank case will tend towards eliminating it. We do not think that present-day petrol would have this effect, though an engine runs at a higher temperature on substitutes than on petrol.

### READERS' REPLIES.

#### Remagnetising Magnets.

There seems to be a certain amount of risk in carrying out your instructions for remagnetising magnets, as given in your Queries and Replies columns in the issue of August 2nd. We would warn your correspondent not to carry out the operation for the following reasons. Three turns of No. 20 (copper) wire wound round each pole would equal, say, two yards, the resistance of which is approximately .0472 ohm, which at 116 volts would give a current of about 2,450 amps. As the fusing capacity of this wire is 70 amps., the chances of applying the current for half an hour are nil. From the above figures it will be seen that about 2,000 yards of No. 20 wire will be required to give 2.6 amps. (at 116 volts), which is the safe current capacity; or, say, 1,000 yards would be safe for half an hour without overheating seriously. The best way would be to wind as much wire on the magnets as possible, and then "flash" the circuit, which method is beyond the scope of a novice—in fact, it is inadvisable for a novice to attempt to remagnetise magnets. Care should be taken to place a piece of iron across the poles when the armature is not in place.—SPARKS AND FLASHES.

#### Timing a Small Twin.

In reply to your reader re timing a twin Moto-Rêve: (a) Set the valve cam wheel main axle and intermediate wheel to their markings, and the valve will be right. (b) The ignition for this must be fixed, the screw in the ring on contact breaker side to be in the centre of the part cut away. Turn the engine over till exhaust has closed and on till piston is at the top of cylinder. Put fibre block on contact breaker to front cam roller, and connect up the pinion wheels to magneto to the others already fixed. The bottom collector of magneto goes to the back cylinder, and the top to the front. If your reader is residing in London, I should be pleased to show him the position of the pinion wheels. I wonder if your reader could tell me where I could obtain piston rings and an ebonite collector.—J. FRETHEY.

### RECOMMENDED ROUTES.

#### DERBY TO CHADDESLEY CORBETT.—B.B.

Derby, Burton-on-Trent, Lichfield, then through Pelsall, Bloxwich, Wolverhampton, Kingswinford, Stourbridge, Hagley, Chaddesley Corbett.

#### LONDON TO ILFRACOMBE.—J.E.

Brentford, Hounslow, Staines, Bagshot, Camberley, Blackwater, Hartley Row, Basingstoke, Whitechurch, Andover, Amesbury, Hindon, Wincanton, Langport, Taunton, Milverton, Bampton, South Molton, Ilfracombe. The distance is approximately 214 miles.

#### CHAPEL-EN-LE-FRITH TO LONDON.—J.C.

Chapel-en-le-Frith, Baslow, Chesterfield, Mansfield, Newark, Grantham, Stamford, Wansford, Stilton, Biggleswade, Baldock, Stevenage, Hatfield, Barnet, Finchley, Golder's Green, Hampstead. The distance is approximately 175 miles.



## MOTOR CYCLES FOR SALE.

## Bat.

BAT Motor Cycle, C.A.V. mag., perfect condition; £8.—24, Tulse Hill, Brixton. [6912]

BAT-J.A.P. Twin, 5-h.p., mag., and sidecar; bargain, £20.—Bridges, 10, St. Ilyds Crescent, Swansea. [6881]

1914 Bat-Jap 6-h.p. Combination, 3-speed, Lucas lamps, speedometer, horn, and wind screen, a very fine and well cared for combination; 40 gns.—96, Ashbourne Rd., Mitcham. [6833]

BAT-J.A.P. 1914 8-h.p. Twin Combination, chain drive, countershaft gear, spring frame, Dunlop tyres, luxurious Bramble sidecar, apron, lamps, best order; £50.—Barratt, Garage, Worcester St., Wolverhampton. [X3855]

8-h.p. Bat-Jap, late 1913, 2 speeds and free engine, with coachbuilt underslung sidecar, fitted with wind screen, Smith speedometer, good tyres, and spares; £38/10, or offer.—Gauden, 63, Mitcham Rd., Tooting, S.W.17. [6884]

## Bradbury.

BRADBURY, 1913, 3½-h.p., 2 speeds, and new coach build; £29/10.—Motor Exchange, Horton St., Halifax. [6717]

1911 Bradbury, 4-h.p., single speed, T.T. bars; £20.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [X492]

BRADBURY and Sidecar, 2-speed gear, new tyres, good condition; owner going away; £35, bargain.—F.G., 36, Clarendon Sq., Pentonville, N. [6729]

BRADBURY, 4-h.p., 1913, F.E., clutch, Bosch, B.B., Drmid forks, Dunlop belt, in perfect running order; owner bought higher power; £20.—2, Buckthorpe St., Bolton. [X3999]

## Brown.

BROWN, 3½-h.p.; £12/10.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6506]

## B.S.A.

B.S.A., 4½-h.p., 1915 combination, in 1916 condition, as new; £60.

B.S.A., 4½-h.p., brand new, actually in stock; £64.—Percy and Co., 319, 321, 335, and 337, Euston Rd., London. [6935]

COLMORE Depots 261, Deansgate, Manchester, for immediate delivery of B.S.A. [X798]

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [6886]

1916 B.S.A. Model H, with accessories, in very good condition; £45 cash.—Walbro Cycle Co., Saffron Walden. [6675]

B.S.A., 1915, and coach sidecar, complete, with lamps, horn, numbers, tools, in fine order; £58.—Batches, Clarence St., Kingstow. [6807]

B.S.A., late 1913, 2 speeds, free, clutch, kick start, chain drive, good order; £28; after 7 p.m.—Hammant, 63, Carlton Vale, Kilburn, N.W.6. [6672]

1917 B.S.A. Model K, with 1916/16 Montgomery sidecar, lamps, horn, and accessories, used 2 months only; £65.—Walbro Cycle Co., Saffron Walden. [6674]

1913 B.S.A. 2-speed, kick starter, with cone sidecar, lamps, horn, speedometer, perfect running order, in condition; 40 gns.; any trial.—Box 14,311, c/o The Motor Cycle. [6922]

B.S.A. 1916 1914 engine Combination, all chain, 4½-h.p., in faultless condition, best B.S.A. sidecar, Lucas accessories; £58.—Burrell, 60, Lea Hall Rd., Leyton, N.E. [6781]

B.S.A. 1915 Combination, 3-speed countershaft, all chain drive, splendid condition; 55 gns.; accept stroke part payment.—Haslam, Wheatsheaf, Newcourt St., Swindon. [6734]

B.S.A. 1916 4½-h.p. Combination, chain drive, B.S.A. sidecar, Watford speedometer, Smith's horn, P. and H. lamps, perfect condition; £65.—Fisher, Brewery House, Newcastle, Staffs. [X4091]

1916 B.S.A., chain-belt, 3-speed countershaft gear, 4½-h.p., suitable for sidecar work; price only 46 gns.; undoubtedly the cheapest B.S.A. in England today.—Julians, 84 Broad St., Reading. [Biggest light car and motor cycle dealer in the South. Phone: 1024.] [6916]

## Calthorpe.

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [X799]

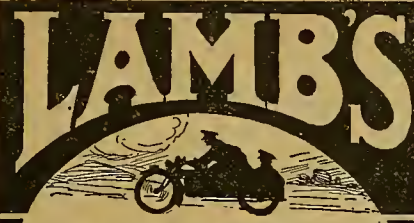
CALTHORPE 2-stroke, 2½-h.p., almost brand new; £23.—44, Finsbury Pavement, E.C.2. [6901]

CALTHORPE, 2-stroke, 1915, 2-speed, good condition; 19 gns.—Ealdwin, Lynton, Western Rd., onford. [X4118]

CALTHORPE-J.A.P., 2½-h.p., September, 1915, 2-speed; £25.—Peters, 18, Lofthair Rd., Harringay, London, N. [6839]

CALTHORPE-J.A.P., 1916, 4-h.p. twin combination, 3 electric lamps, very smart outfit; £63; after 5 p.m.—58, Woodfield Rd., Ealing, W.5. [6847]

CALTHORPE, 1917, J.A.P., latest model, brand new, Enfield 2-speed, in stock; 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6464]



WANTED.—Any number of FIRST-CLASS OUTFITS. Price no object. Cash immediately on acceptance; no sale or return business.

## NEW MACHINES ACTUALLY ON SHOW.

ENFIELD 1917 6-h.p. Outfit .....	£115 0
ENFIELD, 1917, 2½ h.p., 2-sp., 2-stroke	£44 0
ROVER, 1917, 3½ h.p., 3-sp. countershaft	
Combination, with Sidecar .....	£99 4/6
JAMES, 1917, 3½ h.p., twin, 3-speed .....	£69 10
JAMES, 1917, 4½ h.p., No. 6, 3-sp. Comb.	£87 2
ARIEL, 1917, 3½ h.p., 3-speed Combination	£93 10
LEVIS, 1917, 2½ h.p., 2-speed, Model E. ....	£47 10
LEVIS Popular Model .....	£32 0
CALTHORPE-J.A.P., 1917, 2½ h.p., 2-sp.,	
Enfield Sidecar .....	£39 16
CALTHORPE-J.A.P., 1917, 2½ h.p., 2-speed,	
with Sidecar .....	£50 0
ALLDAYS ALLON. All models from ...	£37 10
ROYAL RUBY. All models from .....	£32 10
MATCHLESS War Model, 7 h.p., 3-speed,	
spare wheel .....	£120 0
HARLEY-DAVIDSON, 1917, electric model,	
with H.D. "B" Sidecar, lamps ..	£140 0

## SECOND-HANDS.

ENFIELD, very late 1916, 6 h.p., Combination,	
dyna. lighting, condition very fine	£110 0
ENFIELD, 1916, 6 h.p. Combination, lamps,	
hood, Cowey speedometer .....	£84 0
ENFIELD, 1917, 3 h.p. twin, semi-T.T.,	
2-sp. model, with sporting Canoelet S.C.	£69 10
ENFIELD, early 1916, 6 h.p. Combination,	
and accessories .....	£80 0
ENFIELD, genuine 1917, 6 h.p. Combination,	
speedometer, lamp, and horn,	
scarcely used .....	£105 0
ENFIELD, 1914, 6 h.p. Combination, 3	
lamps, horn, engine just been over-	
hauled .....	£68 10
RADCO, 2½ h.p., 1912-14, great bargain	£12 10
MATCHLESS, 8B, 7-h.p. Combination,	
Lucas accessories .....	£89 10
INDIAN, 1915-16, 7-9 h.p., clutch model,	
1-T. bars, disc wheels, with lamps and	
horn, ridden approximately 1,000 miles	£55 0
TRIUMPH, 1911, 3½ h.p. model, fixed gear,	
semi-T.T. bars, and accessories .....	£20 0
TRIUMPH, 1913, 3½ h.p., 3-sp., semi-T.T.	
bars, a nice little solo mount .....	£35 0
TRIUMPH, 1914, 4 h.p., 3-speed, Starkey-	
Archer gear, Millford Sidecar .....	£48 10
ALLON, 1916 model, 2½ h.p., 2-sp., hand	
clutch, just overhauled by makers ..	£25 10
ALLON, 1917 model, 2½ h.p., 2-sp., hand	
clutch, full kit tools, and Stewart	
warning horn, ridden 200 miles only	£43 0
NEW HUDSON, 1913, 3½ h.p., 3-sp. Comb.,	
with lamp, horn, etc. ....	£39 10 or near offer.
A.J.S., 1915, 4 h.p., 3-sp. Combination, all	
accessories, in excellent order .....	£20 0
O.K. JUNIOR, 1914, 2-stroke .....	£20 0
JAMES, 1913, 3½ h.p., clutch model, with	
accessories .....	£25 0
DOUGLAS, 1914, 2-sp., kick-starter model,	
in fine condition, but needing slight	
repair .....	What offers?
LEVIS 1915 Popular Model .....	£10 0
ENFIELD Family Sidecar .....	£10 0
WATSONIAN Lightweight Sidecar .....	£10 0

WANTED.—SALESMAN and JUNIOR SALESMAN. Progressive position to right man. Easy berth, with plenty of scope. Wages immaterial.

WANTED.—FORD VAN, not earlier than 1915, also B.S.A. or Standard Auto-Wheel.

WANTED QUICKLY.—HARLEY-DAVIDSON, Combination or Solo, 1915-16, either model. Also B.S.A., Solo or Combination.

Owing to the printer's error in the issue of the 16th inst., an A.J.S. at £75 should have been £84; a Harley-Davidson at £75 should have been £75; a Matchless at £25 should have been £95.

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## MOTOR CYCLES FOR SALE.

## Calthorpe.

CALTHORPE, 1917, 2-stroke, Enfield 2-speed, latest model; 33 gns., brand new, in stock.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6465]

CALTHORPE 2-stroke, Enfield 2-speed, new, but slightly shop-soiled; special bargain, 30 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [6466]

1914 4½-h.p. Calthorpe Combination, 2-speed, kick starter, just overhauled, everything splendid condition; £30, or near offer.—R. Summerton, Halford Shipston-on-Stour. [X4005]

CALTHORPE-J.A.P., latest 1917 2-speed model; £39/18; actually in stock; with sidecar £50.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6744]

## Campion.

CAMPION 1917 6-h.p. Twih Combination, 4 speeds, in nice condition; £80.—Percy and Co., 337, Euston Rd., London. [6942]

1916 Campion-Jap 6-h.p. Combination, Jardine gear, perfect condition, also commercial body, and upholstered Pillion seat.—West, 13, Millgarth St., Leeds. [X3847]

## Chater-Pafnir.

CHATER-PAFNIR, 3½-h.p., Grado Multi pulley, Bosch, everything perfect; lowest £16. Bryan, Grosvenor, Hereford. [X4092]

## Chater-Lea.

1915 7-9-h.p. Chater-Lea Combination, luggage carrier, screen, speedometer, accessories; £65.—39, Allen Rd., Peterborough. [X4049]

CHATER-LEA Late 1915 8-h.p. No. 7 Combination, 3-speed gear box, clutch, wind screen, luggage grid, little used; £65.—136, Lambeth Walk, S.E. [6886]

## Chater-Lea-Antoine.

4-h.p. Chater-Lea-Antoine, 2-speed gear, and Millford wicker sidecar, all in good condition; £19/10.—Addy, Brede. [6671]

## Chater-Lea-Blumfield.

CHATER-LEA-BLUMFIELD 5-h.p. Twin Combination, Grado gear, complete with all fittings and lightweight sidecar, good condition; £35.—Barratt, Garage, Worcester St., Wolverhampton. [X3856]

## Chater-Lea-Jap.

COMPULSORY Sale.—Chater-Lea-Jap, 8-h.p., late 1916, 1917 sidecar, not done 1,000 miles, as new.—Lient Jackson, 54, Rosebury Rd., King's Av., Clapham Rd., S.W. [6736]

## Chater-Peugeot.

5-h.p. Chater-Peugeot Combination, Phoenix coach, Mahon clutch, Stewart, Lucas, tyres as new; £35.—C.B., 72, Hotham St., Stratford. [6664]

## Chater-Lea-Quadrant.

CHATER-LEA-QUADRANT, 4-h.p., sidecar, re-upholstered, new tyres, belt, 2-speed gear, in perfect order; £22; owner joining up, must sell.—128, Cumberwell Grove, S.E. [6783]

## Clyno.

CLYNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham and Manchester; inclusive price with spare wheel, 100 gns. [X884]

CLYNO 1914 6-h.p. Combination, spare wheel, luggage grid, etc.; £65, or exchange spring frame 3-speed Indian combination.—Box 1,138, c/o The Motor Cycle. [X4021]

CLYNO Combination, coachbuilt 2-seater, hood, screen, storm sides, speedometer, spares, and accessories, splendid condition; £70; after 6 p.m., or appointment.—Thomas, 32, Ormiston Rd., Shepherd's Bush. [6841]

## Connaught.

CONNAUGHT Miniature, single speed, £33/17/6; ditto, 2-speed, £41/6/6; standard 2-speed, £44/9; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4153]

1916 Connaught Miniature 2-stroke, only done a few miles, Lucas lamps, Stewart's horn, machine as good as new throughout; £29; ride away.—Ross, 228, Devonshire St., Mile End, E. [6647]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new; 42 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4151]

## Dot.

1915 Dot-Jap, 2½-h.p., 2-speed, fast; £21, a gift, accessories.—87, Buckley Lane, Farnworth, Bolton. [X4047]

## Douglas.

DOUGLAS, 1916, 4-h.p., 3 speeds speedometer, condition as new; £64.

DOUGLAS, 2½-h.p., 1915, War Office model, as new; £45.

DOUGLAS, 2½-h.p., 1915, War Office model, as new; £42.

DOUGLAS 2½-h.p., 1913, in nice order; £31.—Percy and Co., 319, 321, 335, and 337, Euston Rd., London. [6933]



## MOTOR CYCLES FOR SALE.

## Douglas.

- 1913 T.T. Douglas, Bosch, Amac, etc., complete: £30.—Cross, Agent, Rotherham. [X4116]
- DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]
- DOUGLAS, 1911, 2-speed; £23.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6500]
- DOUGLAS, 2½ h.p., good running order; bargain, £20/10.—King, 206, Fulham Rd., S.W. [X4125]
- DOUGLAS, 1914, 2 speeds, like new, all extras: £30.—McCull, 77, Finsbury Park Rd., N.4. [6816]
- DOUGLAS, 1911-12, 2½ h.p., good running condition, lamps and tools; £16.—Whitlock, Holsworthy [X3850]
- DOUGLAS, 1914, 2-speed, Philipson pulley; £45.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6501]
- DOUGLAS, 1914, 2½ h.p., good condition, a soldier must sell; £33.—Getgood, 99, George Lane, Lewisham. [6889]
- DOUGLAS, 1913, T.T., 2-speed, Lucas lamps, good condition; £28.—Keep, 3, Seed Hill House, Huddersfield [X4042]
- 2½ h.p. Douglas, in good condition, new belt and tyres, fast and reliable; £12/15.—762, Forest Rd., Walthamstow. [6894]
- 4 h.p. Douglas and Douglas sidecar, exceptional condition; £57, or exchange.—136, Lavenham Rd., Southfields, S.W. [6916]
- DOUGLAS: prompt delivery to farmers, doctors, and others doing work of National importance.—Motat Yevill. Tel.: 50. [5855]
- DOUGLAS, 1915 Colonial Model, excellent running order, tyres nearly new; £40.—Box L4,301, c/o The Motor Cycle. [6793]
- 1914 Douglas, 2-speed, T.T., Lucas lamps and horn, tyres and belt as new; £27/10.—228, Cann Hall Rd., Leytonstone. [6900]
- COLMORE Depots Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [6800]
- DOUGLAS, 1913, 2-speed, Bosch mag.; £35/10: extended payments or exchange.—Service Co., 292, High Holborn, London. [X4142]
- DOUGLAS, 1915, 2-speed, T.T., complete, lamps, horn, tools, numbers, fine order; £42.—Batchelor, Clarence St., Kingston. [6808]
- DOUGLAS, 1915, 2½ h.p., 1916 cylinders, 3-speed, lamps, etc., first-class condition; 47 gns.—Gibb, Douglas Expert, Gloucester. [X3795]
- DOUGLAS, 4 h.p., 2-speed, clutch, kick start, coach sidecar, perfect; £72.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6759]
- DOUGLAS, 2½ h.p., War Office Model, 1916 delivery, F.R.S. mag. lighting, Lucas horn; £49/10. Motor Exchange, Horton St., Halifax. [6718]
- 1915 2½ h.p. Douglas, 3-speed, T.T., footboards, done little more than 1,000 miles, perfect condition, complete; £45.—Bedford House, Bognor. [X5844]
- 1915 2½ h.p. T.T. Douglas, 2 speeds, Binks, long exhaust, Lucas horn, knee-grips; £36.—Woodcock, 23, R.F.C. Villas, S. Farnborough. [6810]
- DOUGLAS, 1912, T.T., genuine, 2 speeds, splendid condition; 33 gns.; accept 2-stroke port payment.—Haslam, Wheatsheaf, Newport St., Swindon. [6735]
- 1914 2-speed Douglas, P.H. lamp set, new tyres, accessories; trial; guaranteed perfect; genuine bargain, £36.—Read, 1, Hare St., Bethnal Green, E. [6827]
- DOUGLAS Combination, 4 h.p., 2 speeds, clutch, kick starter, fully equipped, equal to new; £58.—Wellby Garage, Woodford Rd., Forest Gate. [6906]
- 1916 4 h.p. Douglas, 3 speeds, combination in lovely condition, tyres as new, tools, lamps, etc., an ideal mount.—C.B.H., 46, Woodgrange Rd., Forest Gate. [6862]
- 1915 2½ h.p. 2-speed Touring Douglas, kick starter, clutch, lamp, and horn, good condition throughout; £42.—J. C. Phipp, Sherston, Malmesbury, Wilts. [6895]
- DOUGLAS, 1913-14, 2-speed, new heavy Dunlops, Amac, Bosch, quantity spares, horn, lamps, fine order; £36.—Neat, 182, Linthorpe Rd., Middlesbrough. [X5836]
- DOUGLAS, 2½ h.p., 1915, 2-speed, free engine, fitted electric light, mechanical horn, pump, tools, etc., exceptionally fast; £48, no offers.—27, Cranmer Rd., Forest Gate. [6863]
- 4 h.p. Douglas Combination, 1917, 3-speed model, unscratched, and in perfect condition, very little ridden; £80, or nearest cash offer.—C. F. Walker, 17, George St., Hull. [6707]
- DOUGLAS, Nov., 1915, 2½ h.p., W.D. all black model, excellent condition, splendid starter, lamps, horn, knee-grips, tools; nearest £43; after 8 p.m.—Sennitt, 33, Nicoll Rd., Willesden, N.W. [6840]
- DOUGLAS, 2½ h.p., late 1913, 2-speed, with exceptionally light sidecar, carry passenger with greatest ease in flat country, very suitable for London use, good condition, starts easily, 2 lamps and generator, tyres, belt, etc., in perfect order; seen after 6.—228, South Lambeth Rd. Price £40. [6888]

## MOTOR CYCLES FOR SALE.

## Douglas.

- DOUGLAS Combination (late 1914), 3½ h.p., 2-speed, clutch, kick starter, completely equipped, splendid outfit, just overhauled at cost of £15, bargain, £65.—Burr, Meadow House, Letchworth. [8711]
- DOUGLAS, late 1915, 2½ h.p., 3-speed, Jones speedometer, electric lighting set, footboards, heavy Dunlop tyres, very little used, condition as new; £49.—Apply by letter, or after 8 p.m.; J. Clarke, 64, Lymington Av., Leigh-on-Sea, Essex. [6728]
- 1915 Douglas, 2½ h.p., 2-speed, T.T. model, just overhauled, tyres good, long exhaust pipe, spare tyre, tube, belt, chain, valves, and springs all accessories, and full tool kit; any evening after 7, price £38.—Oliver R.N.A.S., 59, Dresden Rd., Highgate, London, N. [X4082]
- 2½ h.p. Douglas, absolutely new; immediate delivery of models U, V, W, clutch, kick start, against priority permits, for doctors, farmers, war and munition workers. How and where to apply.—For full particulars write to the Douglas Specialists, Robinson's Garage, Green St., Cambridge. Tel.: 388. T.A.: Bicycles. [6876]
- THE Bargain of the Week.—Guaranteed 2½ h.p. 2-speed Douglas, late 1912 model, new 1913, unused for 19 months, take passenger anywhere, Lucas lamps, tools, spares, etc., very fast, powerful, new heavy Dunlop back, waterproof mag.; expert examination welcomed; £23/10, quick sale.—H. Millard, Sydenham Rd., Guildford. [X3837]
- Enfield.
- ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.
- ENFIELD 3 h.p. Twin; £57/10; and 2½ h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [6838]
- ENFIELD Late 1914 6 h.p. Coach Combination; £55.—785, High Rd., Leytonstone. [6650]
- COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [6801]
- ENFIELD, 2½ h.p., mag., fast, perfect; £12/10.—Raid, 44, Blakes Rd., Peckham, London. [X4018]
- ENFIELD 3 h.p. Twin Lightweight, 1916; £40.—Beattie, 97, Central Park Rd., East Ham. [X4166]
- ENFIELD, 1916, 6 h.p., standard combination, in good order; £85; after 5 p.m.—58, Woodfield Rd., Ealing, W.5. [6848]
- 1916 6 h.p. Enfield Combination, dynamo lighting, perfect; £90, offers.—Deatist, 179, High St., Lewisham, S.E. [6842]
- ENFIELD 6 h.p. 1913 Coachbuilt Combination, lamps, etc., good running condition; £36.—40, Replingham Rd., Southfields, S.W.18. [6843]
- ENFIELD, late 1916, 3 h.p., 2-speed, unscratched, and equal to new; great bargain, £45.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [6555]
- ENFIELD 1916 6 h.p. Combination, new condition, Lucas lamps, speedometer, mechanical horn; £78.—Smith, 31, Cambridge Mansions, Battersea Park. [6882]
- 6 h.p. Royal Enfield Combination, 1915, complete with lamps, speedometer, wind screen, and hood, in good condition.—Apply, 109, Burnley Rd., Briercliffe, Burnley. [X4023]
- ENFIELD 6 h.p. Combination, 1914-15, lamps, horn, speedometer, screen, overhauled, new 700 tyre driving wheel; trial; £60.—Weedle, Jeweller, Mallow, Ireland. [6774]
- 1915 Enfield, 3 h.p. twin, 2 speeds, clutch, kick start, all in new condition throughout; rare bargain, £32/10.—3, The Mews, Victoria Rd., North Side, Clapham Common. [6856]
- ENFIELD Combination, hood, wind screen, Stewart speedometer, horn, Lucas lamps, child's spring Pillion, mileage 2,800, perfect condition; £85.—Wilkes, Ellesmere, Salop. [X4120]
- ENFIELD Coach Combination, 1914, mechanically perfect, all tyres nearly new, newly new chains, accessories; any trial; 54 gns.—Barnes, Westgate Villas, Tickhill, Rotherham. [6785]
- ENFIELD Combination, 1913, 6 h.p., picked engine, top-hole condition, new tyres, lamps; £47/10; or exchange B.S.A. countershaft combination.—Birkenhurst, Sunninghill, Ascot. [6853]
- 1915 Enfield 6 h.p. Twin Combination, fitted with Enfield sidecar and luggage grid, speedometer, lamps, and horn, perfect condition throughout; £60.—Lindfield, High St., Crawley, Sussex. [6687]
- ENFIELD, 1916, 3 h.p. twin, kick starter, 2-speed, accessories, tools, almost new tyres, in perfect mechanical condition, pull sidecar; £40; call evenings.—64, Mill Lane, Brixton Hill. [X4062]
- ENFIELD, 6 h.p., C.B. sidecar, late 1914, fine condition, very powerful engine, 3 spare chains, lamps, etc.; £55; exchange lightweight and cash; S. Wales.—Box L4,309, c/o The Motor Cycle. [6920]
- ENFIELD, 1916, 2-stroke, nearly new condition, ridden barely 200 miles, electric head and tail lighting set, dry batteries, all accessories; £40.—Write 12, Bowyer Rd., Salford, Birmingham. [6705]
- ENFIELD, 2½ h.p., 1914, 2-speed, all chain drive Enfield grey, good tyres, head lamp, generator, fuel lamp, been thoroughly overhauled, perfect throughout, bargain, £34.—Mebbs and Mebbs, 156, Gt. Portland St., W.1. [6921]

## SIDE CAR OUTFITS.

- CLYNO, 1914, 6 h.p., 3-speed, detachable wheels and spare, thoroughly overhauled ..... £65
- INDIAN, 1915, 7-9 h.p., 3-speed, Indian coachbuilt Sidecar, just overhauled ..... £65
- SCOTT, 1914, 3½ h.p., 2-speed, kick-start, complete minus Sidecar body ..... £40
- INDIAN, 1916, 7-9 h.p., Powerplus, electric lighting, Indian coachbuilt Sidecar .. £90
- EXCELSIOR, 1915, 7-9 h.p., 2-speed, and Sidecar ..... £45
- TRIUMPH, 1912, 3½ h.p., 2-speed, wicker Sidecar; slight repairs required .... £27

## LIGHT CARS, ETC.

- SWIFT, 1915, 10 h.p., dynamo, just overhauled and repainted ..... £215
- A.C., 1915, 10 h.p., dynamo, excellent order, £20 worth accessories; like new .... £215
- MORGAN, 1916, Grand Prix, water-cooled, disc wheels, finished red, excellent condition ..... £120
- NAPIER, 1913, 15 h.p. Landulette, splendid order. Any trial ..... £225

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- 1916 SUNBEAM Combination, 8 h.p. M.A.G., lamps, horn, screen, in splendid condition ..... —
- 1916 3½ h.p. SUNBEAM Combination, lamps, horn ..... £80 0
- 1917 3½ h.p. SUNBEAM, W.O. Model, fully equipped ..... £78 0
- 1916 HARLEY-DAVIDSON Combination, electric model ..... £90 0
- 1916 HARLEY-DAVIDSON Combination, magneto model, fully equipped ..... £87 10
- 1915 HAZLEWOOD Combination, 4 h.p. twin J.A.P., fully equipped ..... £62 10
- 1917 B.S.A. (new) and Montgomery Sidecar, as depicted in last week's "Motor Cycle," fully equipped ..... £89 10
- 1914 MATCHLESS Combination, 7-9 h.p. M.A.G., fully equipped ..... £68 10
- 1914 INDIAN Combination, 7-9 h.p., 2-sp., clutch, spring frame, electric model ..... £45 0
- 1915 INDIAN, 5 h.p., lamps, horn, fine order ..... £47 10
- 1915 INDIAN, 3½ h.p., lamps, horn, splendid condition ..... £42 10
- 1916 ALLDAYS ALLON, 2½ h.p., single-speed ..... £25 0
- 1915 ENFIELD, 3 h.p., lamps, horn, speedometer ..... £38 0
- 1914-15 water-cooled HUMBER, 3½ h.p., 3-speed, clutch ..... £35 0
- 1912 HUMBER and Sidecar, hood, screen, fully equipped, excellent condition .. £42 0

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## MOTOR CYCLES FOR SALE.

## Enfield.

15 Enfield, 3h.p., 2-speed, chain drive, Dunlops unpunctured, horn, lamps, tools, speedometer, lights to ten gallons petrol, splendid condition, just overhauled; bargain, £35, nearest—Tottiskay, Southleigh, Colyton, Devon. [X3858]

ENFIELD 1916 Combination, 6h.p., 2-speed, combined clutch, Amac carburetter, Bosch mag., fitted with mechanical horn and speedometer; only done 2,000 miles, £90, 1915 combination, 6h.p., 2-speed, clutch, Thompson-Bennett mag., Amac carburetter, fitted with lamps, Stewart speedometer, and horn, £87/10; E.P. exchange.—Service Co., 292, High Holborn, London. [X4119]

ENFIELD Brand New 1917 6h.p. Outfit, £115; also 1917 2½h.p., 2-speed, 2-stroke, £44/2; also 1917 h.p. combination, with 3 lamps, horn, and speedometer, lightly used, £105; 1916 dynamo model, with hood, green, speedometer, and many spares, £110; also an early 1916 standard model, with hood, screen, speedometer, £84; also 1917 3h.p. T.T. 2-speed model and sporting sidecar, 3 lamps, Stewart wagner, £69/10; absolutely in one showroom.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6740]

## Excelsior.

7-9h.p. Excelsior (American) Combination, coachbuilt sidecar; bargain, £37/10.—Palmer's Garage, Tooting. [6826]

EXCELSIOR, 1914, 2-speed, hand clutch, 2-stroke; trial; guaranteed perfect; genuine bargain, £19.—Lead, 1, Hare St., Bethnal Green, E. [6828]

EXCELSIORS.—All models in stock; magneto model £75, electric lighting model £85; get a big X 'on'll be satisfied.—Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester. [X1462]

AMERICAN Excelsior, new Model de Luxe, 7h.p., 3-speed, dynamo lighting outfit, speedometer, £85; Montgomery sidecar to match, £14 to £20; 2-seater decar, £21; liberal exchanges.—The Premier Motor Co., Aston Rd., Birmingham. [6870]

## Harley-Davidson.

HARLEY-DAVIDSON Combination, 1915, in 1916 condition, dynamo lighting; £70.—Percy and Co., 37, Euston Rd., London. [6940]

HARLEY-DAVIDSON Combination, 1915, 7-9h.p., 3-speed; seen in Sidmouth; condition perfect; £65, Box L4,293, c/o The Motor Cycle. [6666]

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models; Harley-Davidsons, and spare parts. [0802]

HARLEY-DAVIDSON Combination, 1916, fully equipped, and thoroughly overhauled; great snip, 85.—Longman Bros., King St., Acton. Phone: 1578 hiswick. [6556]

15 Harley-Davidson 11F, double seated coachbuilt sidecar, screen, special made luggage carrier, extra spring bucket seat on back, lamps, horn, spares, regular family combination; £69.—Noble, 52, Topham, Lamilton. [X4041]

HARLEY-DAVIDSON, electric model; this machine was only used for 3 months, and has since been used only to my going on active service; as good as new; price £60, no lower offer.—Major Baldwin, 8th C.B., France. [X3857]

HARLEY-DAVIDSON, brand new, 1917 electric model, and their latest model B sidecar, with wind screen, 3 lamps, horn, absolutely in stock. Wanted, second-hand H.D. solo or sidecar, quickly.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6739]

HARLEY, 1916 racing model, 7-9h.p., single-speed, clutch, racing exhaust pipes, rubber covered footboards, T.T. handle-bars, Goodyear tyres, finished in Harley grey; this machine is an ideal sporting mount, and has had very little use; £63/10; extended payments on exchange.—Service Co., 292, High Holborn, London. [X4149]

## Hazlewood.

15 5-6h.p. Twin Hazlewood Combination, 3 speeds, combined belt and chain, kick start; £58/10.—Motor Exchange, Horton St., Halifax. [6719]

HAZLEWOOD 1914 4-5h.p. Twin Combination, 3-speed countershaft, speedometer, wind screen, lamps, etc.; £45; by appointment.—Weeden, 51, New Cross Rd., London, S.E. [X4124]

HAZLEWOOD 1915 Combination, 5-6h.p. J.A.P. engine, 3-speed, clutch, and kick starter, Lucas lamps, speedometer, special sidecar; £72/10; extended payments on exchange.—Service Co., 292, High Holborn, London. [X4146]

## Henderson.

NEW 10h.p. 4-cyl. Henderson, with Swan de Luxe coachbuilt sidecar, a very luxurious outfit, believed to be the last machine of its kind in the country, will do 45 m.p.g. on paraffin; solo machine considered in exchange.—Oram, Colin Park, The Hyde, N.W.9. [6865]

## Humber.

14 3½h.p. 3-speed T.T. Twin Humber; £28.—11, Aigburth Vale, Liverpool. [X4110]

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

14 3½h.p. 3-speed Humber, lamp, etc.; £35, cash or easy terms.—R. E. Jones (Garages), Ltd., Swanor. [0863]

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**TAN - SAD Spring Pillion Seats, from 27/-.** All Models stocked. Send for Special List.

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Rito, the new hand cleanser, 1 lb. tins .....	7d., post 5d.
Forward Tappet Adjusters, set of 4 .....	6d., " 1d.
Terry's Pocket Screwdrivers .....	4d., " 1d.
Terry's Magneto Spanners .....	6d., " 1d.
Terry's Valve Spring Lifters .....	1/10, " 3d.
Sphinx Plugs, from .....	2/6, " 2d.
Electric Racing Plugs .....	7/6
EUK Easy Starters .....	21/-
T.W.R. Aluminium Rear Lamps .....	5/8
T.W.R. Aluminium Sidecar Lamps .....	7/6
Hans Renold Chains, 1/2" x 1/2" .....	5/- per ft.
Hans Renold Chains, 1/2" x 1/2" .....	4/-

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Telegrams—"Dynametro, Westcott, London."

## MOTOR CYCLES FOR SALE.

## Humber.

HUMBER, 1912, 3½h.p., 2 speeds, spring forks, in good condition; £24.—Motor Exchange, Horton St., Halifax. [6720]

1913 Humber, 2-speed, free engine, as new, run 6,000 miles, a nice light bike; price £40.—E. Copping, White Horse, Dune End, Ware. [X4113]

1917 Humber, 4h.p. opposed twin, brand new, been 48 miles only, with £3/10 Lucas lamp, large Lucas horn, Stewart speedometer; £73/10.—Walbro Cycle Co., High St., Saffron Walden. [6673]

## Indian.

INDIAN, 1915, 5h.p., 3 speeds, in exceptional nice condition; £48.

INDIAN, 1915, 7-9h.p., T.T., very fast, in nice condition; £43.—Percy and Co., 337, Euston Rd., London. [6933]

INDIAN 1915-1916 5-6h.p. 3-speed Combination; £58/10.—785, High Rd., Leytonstone. [6651]

1914 7-9h.p. 2-speed Indian Combination for sale, £45.—Jell, 30, Deacon St., Waltham, S.E. [6712]

INDIAN, 1915, 7-9h.p., 3-speed, spring frame, Indian coach sidecar, new condition; 60 gns.—785, High Rd., Leytonstone. [6649]

7-9h.p. Indian 1914 Combination, 2 speeds, spring frame, plenty spares, sound condition; £48.—13, Arklow Rd., New Cross, S.E. [6488]

INDIAN, 1915, clutch model, 7-9h.p., Dunlop tyres, T.T. bars, excellent condition; accept 33 gns.—12, Cliff Town Rd., Southend-on-Sea. [6737]

INDIAN, 1914, clutch model, just overhauled, new tyres, all accessories; £36, bargain.—H. Ingram, 17, Coleman St., Wolverhampton. [X4121]

1916 7h.p. Powerplus Indian, T.T., ridden 250 miles, condition perfect, Klaxon; £65, no offers; owner in France.—Captain Leng, Sandycote, Sheffield. [6656]

INDIAN, 1915 T.T., 7-9h.p., clutch model, disc wheels, heap accessories; £55.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6745]

1915 5h.p. T.T. Indian, 3-speed, kick start, clutch, electric light, very little used, everything in top hole condition; £44.—34, Cumberland St., Luton, Beds. [6780]

INDIAN 1916 7-9h.p. Combination, spring frame, 3-speed, electric lamp, horn, spares, tools, about 2,000 miles, in splendid condition; £75.—14, Chipley St., New Cross, S.E.14. [6854]

1916 Power Plus, 7-9h.p. Indian, fitted all accessories, with Bramble underslung sidecar, guaranteed as new; £85.—Lieut. H. Gill, c/o Dan Guy, Weymouth. [6863]

1914 7h.p. Spring Frame Indian, electric lighting outfit, horn, and speedometer, countershaft gear, kick starter, good condition; £45.—The Premier Motor Co., Aston Rd., Birmingham. [6871]

1914 Indian Combination, 7-9h.p., 2-speed, spring frame, electric model, fitted with kick start, in excellent condition; £55.—Write appointment, Caruthers, 48, Avenue Rd., Southend-on-Sea. [6814]

INDIAN 7-9h.p. 2-speed Combination, horn, lamps, sidecar, good running order; owner at the Front; price £45, or close offer.—Calf and Co., Motor Garage, Broadway, Wimbledon. (Opposite Theatre) [6782]

1915 Indian 5h.p. Sporting Combination, semi T.T., Montgomery Zeppelin cone sidecar, accessories, mileage 3,500, beautiful condition throughout; £52, no offers.—Woodman, Blunethorpe, Maidstone Rd., Chatham. [6788]

POWERPLUS 7-9h.p. Indian, 1916, complete with Millford sidecar, new condition throughout, mileage 4,600, Lucas lamp set, numerous spares; owner ordered Overseas; exceptional bargain, £75.—Box L4,306, c/o The Motor Cycle. [6915]

A 7-9h.p. Powerplus Indian, late 1916, T.T. bars, 3-speed, kick starter, hand and foot clutch, fully equipped, lamps, horn, speedometer, watch, etc., 70 m.p.g., and very fast, condition absolutely unscratched; any trial; £68/10.—83, Church Lane, Charlton. [6667]

INDIAN, 1915, 7-9h.p., spring frame, 3-speed, T.T., electric horn and lights, speedometer, all tools, many spares, nickelled cylinders, disc wheels, bought 1916, perfect condition, mileage under 2,200; any examination; £65.—Box 1,117, c/o The Motor Cycle [X3662]

INDIAN, 1916, 7-9h.p., 3-speed, with Indian coachbuilt sidecar, in first-class condition, complete with 3 lamps, generators, speedometer, Stewart mechanical horn, new all-weather wind screen, many spares and tools, very fast, only wants seeing; first offer £70 secures.—Rathbone, 163, Cripplewood Broadway, N.W. Tel.: 1458 Hampstead. [6772]

7-9h.p. Indian 1914 Millford coach Combination, spring frame, 2-speed, electrically equipped (new accumulators), recently overhauled, fitted for substitute; speedometer, smart outfit, inspection invited; £52/10, or near cash offer; would consider exchange 4½h.p. chain drive 3-speed coach combination.—Wickens, Hill crest, Stanley Rd., Wallington. [6794]

## Ivy.

IVY, 2-stroke, 2½h.p., 1915, good tyres, fully equipped as new throughout; £25.—Advertiser, 156, Gt Portland St., W.1. [5924]

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**JAMES** Combination, 1914, 4½ h.p., fully equipped, lamps, tools, spare tyre; bargain, £42; would exchange for 2½ h.p. Douglas and cash adjustment; appointment.—Unwin, 120, St. Donata Rd., Lewisham, S.E. [£6771]

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**J.H.**, new, 1917, 2-stroke, 2-speed; 42 gns.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [£6507]

**J.H.**, 2-speed, new; £35/14; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4152]

Kelecom.

**KELECOM**, 3½ h.p., Bosch waterproof mag., low dropped frame, new belt and tyre, n.o.v., pull sidcar, £12/10; sidcar for same, £1/10; call evenings.—64, Mill Lane, Brixton Hill. [X4067]

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**LEA-FRANCIS** Combination, late 1915, 2 speeds, luggage and petrol can carrier, wind screen, speedometer, extra child's seat; £65.—Tanver, 62, Earlsdon Av., Coventry. [X4159]

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**LEVIS** Popular, as new, few weeks old; £26/10.—65a, Rosendale Rd., Dulwich. [£6792]

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**LEVIS**, 1916, 2½ h.p., 2-stroke, splendid condition; bargain for quick sale, £18/10.—3, The Mews, Victoria Rd., Clapham, S.W. [£6857]

**LEVIS** Model E, £47/10, and also Popular model, £32, in stock.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [£6747]

**LEVIS**, 2½ h.p., 1915, 2-stroke, head lamp, generator, rear lamp, good tyres, fully equipped; bargain, £24.—Advertiser, 156, Gt. Portland St., W. [£6609]

**LEVIS**, 2½ h.p., 1915, Bosch mag., just overhauled, completely fitted for paraffin, T.T. bars, accessories, condition perfect; bargain, £22; after 7.—63, Craven Park Rd., Harlesden, N.W. [£6855]

**LEVIS** 2½ h.p. Popular Lightweight, 2-speed, chain and belt drive, rubber studded tyres, brand new, in stock for immediate delivery; reduced price, £44.—Mehes and Mehes, 156, Gt. Portland St., W.1. [£6928]

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**MANCUNIAN**, 2½ h.p., 2-speed; £33.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [£6502]

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**MATCHLESS** Model 8B2, only done 1,000 miles, as new, Lucas electric lighting set, detachable wheels and spare; seen any time; £92.—73, New Rd., Woking. [£6706]

**MATCHLESS** 1917 Combination, 8 h.p., 3-speed, clutch, and kick starter, detachable wheels, including spare wheel, new; £120; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4157]

**MATCHLESS**, late 1915, 7 h.p. M.A.G. coachbuilt sidcar, just repainted black, and gold line, as per Sunbeam, all accessories; £85.—Cass's Motor Mart, 5, Warren St., Euston Rd., W.1. Museum 623. [£6821]

**MATCHLESS** Latest 1917 War Combination, with spare wheel; £120; absolutely here on show; also 1914 8B 7 h.p. combination, with heap of accessories, just in.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [£6753]

Minerva.

**3½ h.p.** Minerva, Bosch mag., tyres nearly new, good 32 condition; offers.—G.W., 12, Albert Rd., Bexley, Kent. [X4060]

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**MOTO-REVE**, 2 h.p., twin-cyl., mag., good condition.—Gardham, Railway Terrace, Garforth, Leeds. [X4167]

Motosacoche.

**1914** 3½ h.p. Twin Motosacoche Combination, kick starter, electric lamps, luggage carrier, etc., driven 1,000 miles; £50, or near offer; would sell separately.—Can be seen at 8, Bessborough Mews Westminster. [£6821]

New Colonial.

**NEW** Colonial Motor Cycle, Villiers engine, 2½ h.p., 2-stroke, perfect condition; £20, or nearest offer.—S. Dixon, Grendon, Atherstone. [X4021]

New Hudson.

**NEW** Hudson, 1914, 3-speed, clutch, new tyres; £32 or near offer.—Robinson, 35, Star Rd., Caversham. [X4087]

**2½ h.p.** New Hudson Lightweight, 3 speeds, in nice condition; £19/19.—Motor Exchange, Horton St., Hulfax. [£6722]

**NEW** Hudson, 2-stroke, 2-speed, Model C; a gift £23, accessories.—87, Buckley Lane, Farnworth Bolton. [X4041]

**NEW** Hudson 6 h.p. Twin Combination, 3-speed, 1914, £60.—W. and H. Motor Co., Ltd., 287, Deansgate Manchester. [£6501]

**1916** New Hudson, 2-stroke, fixed gear, perfect condition, or exchange Douglas.—29, Lea Bridge Rd., Clapton, E.5. [£6677]

**NEW** Hudson, late 1915, Big Six, with Mills-Fulford Empress sidcar, little used, in perfect order; £70.—Jackson, Draper, Thornaby-on-Tees. [X4022]

**1915** New Hudson Combination, 3-speed, clutch, kick starter, fitted latest Druid forks, all accessories £45.—Richards, Station Buildings, Keighley. [X4000]

**NEW** Hudson, 1914, 2½ h.p., 2-stroke, 3-speed, in fine order, with new Dunlop tyre and tube; £25, or near offer; call any time after 7 o'clock.—Wilson, 21 Birkbeck Rd., Acton, London. [£685]

**LATE** 1914 4 h.p. New Hudson Coachbuilt Combination, new Armstrong 3-speed fitted, perfect mechanical condition, fully equipped; bargain, £35, lower.—Sgt. Roberts, c/o Skeats, Grosvenor Rd., Aldershot. [X4000]

**NEW** Hudson Combination, 1914, 3½ h.p., 3-speed chain-cum-belt drive, kick starter, Bosch water proof mag., coachbuilt sidcar, wind screen, lamps, as new; £42.—The Premier Motor Co., Aston Rd., Birmingham. [£6877]

New Imperial.

**NEW** Imperial, 1917, 2½ h.p., 3½ h.p., 6 h.p. model in stock.—Crow Bros., Guildford. [£256]

**COLMORE** Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [£6800]

**1916** New Imperial-Jap, 2½ h.p., accessories, new condition; £32.—T. Arthurs, c/o 16, Queen Rd., Basingstoke. [£680]

**NEW** Imperial-Jap, 1914, 2-speed, 2½ h.p., all accessories, in splendid condition; £24; call evenings. 64, Mill Lane, Brixton Hill. [X4000]

**NEW** Imperial-Jap: immediate delivery all models. Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter and Tavistock Rd., Plymouth. [£688]

**NEW** Imperial, late 1915, as new, 2-speed, 2 lamp and generator, horn, tyres as new; £25.—1 Bloomfield Rd., Plumstead, S.E.18. [X4000]

**NEW** Imperial, 2-speed, new, 39 gns.; 2-speed, clutch and kick starter, 46 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4157]

**NEW** Imperial-Jap, 2½ h.p., 1915, 2-speed gear box new tyres and belt, just thoroughly overhauled at re-enamelled; £27/10.—21, Station Rd., Forest Gate London, E. [£641]

**NEW** Imperials, 1917 models, for immediate delivery No. 1 39 gns., No. 2 46 gns.; two new 1916 models No. 1 at £38.—Colmore Depots, 211, Deansgate, at 31, Renshaw St., Liverpool. [£688]

**1916** New Imperial-Jap, absolutely new, never been used; first cheque for 32 gns. secures this bargain.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealer in the South. 'Phone: 102 109 [£688]

**NEW** Imperial Combination, Lightweight, 2½ h.p. J.A.P. engine, absolutely new, few days ago at £58; lamps and all complete, will sell £50 cash, delivered free on rail.—B. D. Micklethwaite, Birdsed Mills, Denby Dale, near Huddersfield. [£677]

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**NORTON** 1916 Combination, 4½ h.p., 3 speeds, perfect order; £65.—Percy and Co., 337, East Rd., London. [£69]

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**WHAT** Offers?—N.S.U. cycle, a.v.v., twin, S.C. from B.B. variable, N.S.U. gear, Bosch.—51, Cross Green Otley, Yorks. [X39]

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## O.K.

K. Juulors.—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilbarn. [0910]

K. Junior, Mark IV., standard, new; 38 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4150]

15 O.K. Lightweight, 2-speed countershaft, almost new; bargain, £23/10; private owner.—Harris, Chestnut Rd., West Norwood. [6485]

K. Junior, 2½ h.p., 1915, countershaft 2-speed, new condition, 4-stroke, nice little machine, 100 m.p.g., ended tyres and belt; £22; call evenings.—64, Millers, Brixton Hill. [X4066]

K. Precision 4½ h.p., 1914, dropped frame (latest design for countershaft gear, but now fitted with test type Grado ball bearing gear), lamp, and accessories, new tyres and belt, good bargain, and stand a test trial; £22/10; call evenings after 8 o'clock.—64, Mill Lane, Brixton Hill. [X4063]

## P. and M.

and M., 3½ h.p., 2 speeds, and underslung sidecar; £22/10.—Motor Exchange, Horton St., Halifax. [6722]

15 P. and M., complete with sidecar, hood, screen, and all fittings, splendid condition; £75.—Turner, 29, Preston Rd., Brighton. [5500]

14 P. and M., 2-speed, 3½ h.p., with coachbuilt sidecar, splendid running condition; £45; or rest offer.—Appleyard, Shalden, Alton, Hants. [X4109]

and M., 1912, 3½ h.p., Bosch, 2 speeds, countershaft, perfect condition, also wicker sidecar, suits for same; £26.—Satchell, Granville St., Union Rd., Richmond, Yorks. [X4048]

## Peugeot.

MOTOR Cycle and sidecar, 5-6 h.p. Peugeot; £15.—Chapman, 32, Eleanor Rd., Waltham Cross, Herts. [6765]

h.p. Peugeot, B. and B. carburettor, adjustable pulley, £2/10; Bosch magneto, twin, perfect, £3.—Roberts, on Avel, Mold. [X4030]

h.p. Twin Peugeot, 3-speed, and sidecar, good condition, lamps, good tyres, Druid forks, accessories; £22; or offers.—F. H. Withers, 4, College Rd., Waltham Cross. [6796]

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POPE, 7-9 h.p., 3,000 miles only, Millford sidecar, luggage boot, tyre carrier, spare tyre, tube, accessories, as new; £80; or near offer.—2, West Park, Dartington. [X4080]

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REMIER, 3½ h.p., 1914, little used; £18/10.—Whitlock, Holsworthly. [X3850A]

h.p. 1915 Premier and Canoelet, 3-speed countershaft; £50.—Palmer's Garage, Tooting. [6824]

REMIER, 1915, 3½ h.p., 3-speed countershaft gear, £45; 1916, with sidecar, 3½ h.p., spare tank, £69; extended payments or exchange.—Service Co., 292, High Holborn. [X4144]

## Quadrant.

UADRANT 4 h.p., 1916 Combination, 3-speed, all-chain drive; £60.—W. and H. Motor Co., Ltd., Deansgate, Manchester. [6508]

UADRANT, 4½ h.p., 3-speed, countershaft, and sidecar; just cost £72/10; only ridden 3 weeks; best offer over £50.—George Knight, 65a, Rosendale Rd., Litch. [6791]

## Radco.

ADCO, 1916, single speed.—5, Bonheur Rd., Bedford Park. Phone: 948 Chiswick. [X4000]

14 2½ h.p. Single-speed Radco, very good condition; £12.—The Premier Motor Co., Aston Rd., Birmingham. [6874]

ADCO, 1914, single speed, 2-stroke, a real bargain.—Lamb's, 151, High St., Walthamstow, and 50, Wood Green, N. [6741]

## Revere.

16 2½ h.p. Revere, 2-stroke, Villiers engine, Thomson-Bennett mag., all accessories, condition as new throughout; total cost £48, accept £29/10 quick sale.—Smith, 279, High Rd., Leyton, London. [X4074]

## Rex.

EX Motor Cycle and Sidecar, 1913, 5-6 h.p., 2 speeds, free engine; £38; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4139]

h.p. Rex, mag., 2-speed gear, wicker sidecar, needs repairs; particulars given; offers invited.—Nelson Gibson, Monumentalist, Kirby Stephen. [X3756]

h.p. Rex, splendid condition, Bosch mag., B.B. carburettor, long footboards, all tools, lamp, horn, horn spares, good tyres, ready to ride away; £2.—Wingrove, Sarum, Fleet, Hants. [6786]

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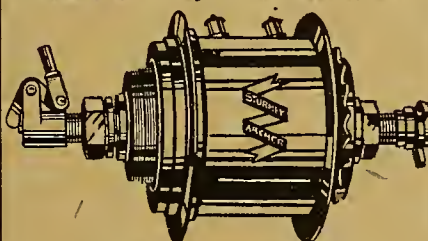
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REX-JAP, 6 h.p. Twin, 2-speed, handle starter, enclosed Bosch, B. and B. Cover, Lucas lamps, Watsonian wicker sidecar (sporting), good tyres and condition; trial; £37/10.—Care, 20, Church Hill, Aldershot. [6815]

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COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [0883]

1914 Rover and Millford coachbuilt sidecar, complete, lamps, etc.; £48.—Cross, Jeweller, Rochester. [X4114]

ROVER Motor Cycles, 1917 models from stock; £74/10; two only; first cheque secures.—Colmore Depot, 211, Deansgate, Manchester. [0887]

ROVER, 1916, 3½ h.p., countershaft model, C.B. sidecar, with child's seat, mileage under 500, nearly new condition; £68; after 5 p.m.—58, Woodfield Rd., Ealing, W.5. [6849]

ROVER Latest 1917 3½ h.p. Combination, absolutely here on show; £99/4/6; extremely smart lot.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [6742]

ROVER 1916 Combination, 3½ h.p., 3-speed countershaft, condition new, lamps, horn, screen, accessories, etc.; bargain, £52/10.—Walker, 31, Feraday St., Walkden, near Manchester. [X4106]

## Royal Ruby.

ROYAL Ruby, 2-stroke, single speed, new; £29/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4155]

ROYAL Ruby 2-stroke, single speed, nearly new; £20; seen any time by appointment.—Painter, Denmark St., Wokingham, Berks. [6913]

BRAND New Standard Model 2½ h.p. Royal Ruby, 2-stroke; reduced to £29/10; immediate delivery.—The Premier Motor Co., Aston Rd., Birmingham. [6873]

ROYAL Ruby, 2½ h.p., perfect running order, good chamber, recently overhauled, rebushed, etc., lamps, horn, etc.; £23.—Box L4,313, c/o The Motor Cycle. [6715]

## Rudge.

RUDGE Multi, 1916, speedometer, almost new; £45.

RUDGE, I.O.M., special fast machine, as new; £50.

RUDGE Multi, 1914, speedometer, perfect order; £30.—Percy and Co., 319, 321, 335, and 337, Euston Rd., London. [6937]

RUDGE Multi 3½ h.p. 1913 Combination; £43.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6504]

LATE 1914 5-6 h.p. Rudge Multi, complete, excellent condition; £36; or near offer.—38, West St., Reigate, Surrey. [6831]

1914 T.T. Rudge, N.S.U. gear, electric lamps, horn, appearance as new; cheap; what offers?—Write, Mayes, 198, Ancona Rd., Plumstead. [X4052]

RUDGE, Grado Multi gear, late 1912, 3½ h.p., fully equipped, fine running order; £25.—Wellbroy Garage, Woodford Rd., Forest Gate. [6904]

RUDGE Multi, 1913, 3½ h.p., speedometer, fully equipped, good condition, reliable; £28.—Wellbroy Garage, Woodford Rd., Forest Gate. [6903]

RUDGE Multi, 1915, 3½ h.p., speedometer, fully equipped, very fast and fine condition; £43.—Wellbroy Garage, Woodford Rd., Forest Gate. [6902]

RUDGE Multi Combination, hand clutch, kick start, all accessories, perfect condition; any trial; £38; or exchange good lightweight.—C.S., 497, Old Ford Rd., Bow. [6701]

RUDGE Multi, 3½ h.p., special Millford coach sidecar, hood, screen, 3 lamps, spares, tyres, nearly new, thoroughly overhauled and cleaned, condition excellent; really cheap, 44 gns.—Chantry Motor Works, Hatch End, Middlesex. [X4029]

RUDGE Multi, 1913, fitted for substitute, excellent condition, £33/5; Isle of Man engine model, fitted with large head lamp, and Klaxon mechanical horn, 1914 model, £30/10; Multi, in excellent condition, 1914, practically new tyres, T.T. bars, £31; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4138]

## Scott.

COLMORE Depots, Birmingham, and Manchester, for Scott motor cycles. [0806]

SCOTT, 2-stroke, 2-speed, kick starter, wants putting together; bargain, £16.—Reilly, 215, Overgate, Dundee. [6652]

SCOTT, late 1914, Binks 3-jet, lamps, etc., and spares, handsome machine; £40.—French, Station Rd., Hykeham. [6685]

SCOTT, 1914, and sidecar, 2-speed, kick starter, 2-cyl. 2-stroke, Binks carburettor, Stewart speedometer, Palmer cord tyres; £65; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4148]



## MOTOR CYCLES FOR SALE.

## Service.

**SERVICE**, 2½ h.p., 2-stroke Peco engine, chain and belt drive, 1915, a very reliable proposition, 2-speed, Harcourt extra cooling fins; £35; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4141]

## Shaw.

**3 1/2 h.p.** Shaw, Saxon forks, Amac, Helleisen's ignition, 32 running order; bargain, £5/15.—Box L4308, c/o The Motor Cycle. [6921]

## Singer.

**3 1/2 h.p.** Singer, 3-speed, clutch, kick starter, perfect; £2 £32.—95, Shaftesbury Rd., Hammersmith, W. [6708]

**SINGER**, 4½ h.p., 2-speed, free engine, fitted with sidcar complete, good running condition; £38.—Taylor, Westbank, Hanow, Essex. [6838]

**4 1/2 h.p.** Singer, 2-speed, clutch, Bosch, new tyres and £2 belt, coachbuilt sidcar, guaranteed in sound condition; £30.—4, Doolittle, Hemel Hempstead, Herts. [6655]

**SINGER**, 4½ h.p., 1915, Canoelet sidcar, gear box, clutch, kick starter, wind screen, spare valves, etc., faultless; £37/10.—25, Warham St., Kennington Park. [6779]

## Sparkbrook.

**1915 Sparkbrook**, 2-speed, 2½ h.p., Lucas horn and lamps, perfect running order; £25.—Rev. Lion, Albert Rd., Alton, Hants. [X3859]

**SPARKBROOK**, 1917, 2-stroke, 2-speed, unscratched, just cost £45, indistinguishable from new; £37; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4140]

## Sun.

**SUN-VITESSE**, 2-stroke, 2-speed, new condition, accessories; £30.—87, Buckley Lane, Farnworth, Bolton. [X4045]

**COLMORE Depots**, Birmingham and Manchester, for delivery from stock of all models of Sun motor cycles. [0807]

**SUN-VILLIERS**, late 1915, 2-stroke, excellent order, and a great snip, £17.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [6925]

**SUN-VILLIERS**, 2-speed, new, £37/16; V.T.S. single speed, new, £30/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X154]

**SUN-VILLIERS**, 2½ h.p., 2-stroke, single gear, new tyres and belt, horn, and lamp, splendid running machine, and enamel and plating in good condition; bargain, £16/10; call evenings.—64, Mill Lane, Brixton Hill. [X4065]

## Sunbeam.

**SUNBEAM Combination**, 1917, 3½ h.p., fully equipped, indistinguishable from new; £105.—Percy and Co., 337, Euston Rd., London. [6939]

**1916 Sunbeam**, 3½ h.p., semi T.T. bars, 3-speed model, hand controlled clutch, kick starter, including all accessories, not done 500 miles; £73.—Box 1,143 c/o The Motor Cycle. [X4090]

**SUNBEAM Combination**, 3½ h.p., late model, with 3 lamps, Lucas horn, speedometer, 35/1 Pillion seat, absolutely as new; £85, no offers.—Short, 485, Upper Richmond Rd., East Sheen. [6670]

**SUNBEAM**, 1914, 3½ h.p., coachbuilt sidcar, Gloria spring wheel, perfect mechanical condition, appearance almost new; £63; any trial; 40 gallons petrol.—Box 1,131, c/o The Motor Cycle. [X3860]

**SUNBEAM**, 1916 (late), 3½ h.p., 3-speed, h.b.c., speedometer, horn, and tools, condition as new; 70 gns.; will take Triumph 3-speed in part.—Hamsterley, 54, Langham Rd., Teddington, Middlesex. [6767]

**1916 Sunbeam**, 3½ h.p., semi T.T. bars, black and gold, 3-speed hand controlled clutch, nearly new, few miles only, perfect condition, with lamps, mechanical horn; £76.—Robinson's Garage, Green St., Cambridge. [6879]

**1917 3 1/2 h.p.** Sunbeam, W.D., green model, in magnificent condition, mileage 350, Lucas lamps, speedometer, Klaxon, A.K. grips, heavy Dunlops unpunctured, exceptionally fine engine; any examination; best offer over £75.—Box L4305, c/o The Motor Cycle. (D) [6917]

**1916 3 1/2 h.p.** Sunbeam Combination, black and gold, 3-speed, hand controlled clutch, Amac carburetter, Lucas horn, Watford speedometer, recently new Bates heavy tyre and tube on driving wheel, and Pedley heavy tyre and tube on sidcar, new Lucas best motor cycle and sidcar lamps, 2 spare valves, and spares, only done 2,400 miles, in excellent condition; 82 gns.—Jarrett, Pharmacist, Trawsfynydd, Merioneth. [X4044]

## T.D.C.

**DE LUXE T.D.C.**, 1916, 2½ h.p.; £23.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6505]

## Triumph.

**3 1/2 h.p.** Triumph, T.T., waterproof mag., fast machine; £2 £18.—Palmer's Garage, Tooting. [6825]

**1913 Triumph**, 3 speeds, complete, lamps, etc.; £34.—Cross, Eppingham Sq., Rotherham. [X4115]

**1911 Triumph**, clutch model, fine order, lamps; £19.—53, Brownhill Rd., Catford. [6799]

**TRIUMPH**, 1913, clutch model, as new, lamps, horn; £25.—116, Bearton Rd., Hitchin, Herts. [6891]

## IN STOCK TO-DAY.

1917 ENFIELD, 3 h.p., 2-speed 63 Gns

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kick-starter ..... 46 Gns

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not done 100 miles .... 35 Gns

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soiled ..... 32 Gns

1916 INDIAN, 5-6 h.p., 3-speed 55 Gns

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## MOTOR CYCLES FOR SALE.

## Triumph.

**1913 F.E. Triumph**, splendid condition, owner in France; £25. Alfred Drake, Sutton, Ely. [X4006]

**TRIUMPH**, 3½ h.p., 2-speed, and coachbuilt sidcar, wants cylinder; £15.—26, Loxley New Rd., Sheff. field. [X3848]

**TRIUMPH**, 1911, Armstrong 3-speed, coachbuilt sidecar, lamps, etc.; £30.—James, 23, Rosedale Rd., Forest Gate, E. [6910]

**TRIUMPH**, 1909, 3½ h.p., 2 speeds, £19/10; 1911 3½ h.p., spring forks, £22/10.—Motor Exchange, Horton St., Halifax. [6723]

**1914 Triumph**, 4 h.p., 3-speed, lamps, horn, excellent condition; £37/10.—Elce and Co., 15-16, Washopgate Av., Camonile St., E.C. [0552]

**TRIUMPH**, 3½ h.p., weatherproof mag., new tyres, good running order; £10, offers.—Cannon, Yew Tree Cottage, Hayes End, Middlesex. [X4083]

**TRIUMPH**, with sidcar, 3½ h.p., mag., 2 speeds, lamp; £23/10.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [6811]

**TRIUMPH**, 1912, 3½ h.p., and sidcar, free engine, all accessories, just thoroughly overhauled; £22/10.—Doughty, 6, Meredith Rd., Clacton-on-Sea. [6899]

**TRIUMPH**, 3½ h.p., 2-speed, F.E., new tyres and tubes, cane sidcar, side door; £22.—G. Applin, 2, Nora Villas, French St., Sunbury, Middlesex. [6830]

**1914 4 1/2 h.p.** Triumph, 3-speed, coachbuilt sidcar, speedometer, lamps, etc., only travelled 1,500 miles; £55.—Procter, Station, Crosshills, Keighley. [X4050]

**TRIUMPH**, 1913, 3-speed, lamps, horn, speedometer, and coachbuilt sidcar, good condition; £35, bargain.—Coles and Soa, 25, St. Barnabas St., Pimlico. [6733]

**TRIUMPH**, 1913, with coachbuilt sidcar, N.S.U. 2-speed gear, free engine, speedometer, perfect condition; £28.—Goddard, 2, Reigate Rd., Ewell, Surrey. [6898]

**TRIUMPH**, late 1913 T.T. model, specially tuned, fast and flexible, economical, excellent condition; £25.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [6924]

**1914 Triumph**, 4 h.p., Sturmer-Archer 3-speed, clutch, with sporting Watsonian coachbuilt sidcar, smart outfit; £49; exchanges.—Newham, 223, Hammersmith Rd., W.6. 'Phone: 80. [6867]

**TRIUMPH**, 1914, 4 h.p., 3-speed, clutch, Lucas lamp set, horn, and speedometer, splendid condition, and Swan coachbuilt sidcar; £42.—Milnes, 12, Radcliffe Av., Harlesden, N.W.10. [X4057]

**TRIUMPH**, 1913, Sturmer-Archer 3 speeds, with 1916 Canoelet Minor sidcar, very little used, new condition, guaranteed perfect; £40; machines only £34.—31, Mount Pleasant, Redditch. [6710]

**TRIUMPH 1914 Coachbuilt Combination**, Sturmer 3-speed, clutch, Bosch, Senspray, Lucas lamps, spares, tyres as new, all in excellent condition; £45.—Sandy, Highland Rd., Aldershot. [6855]

**1913 Clutch Triumph**, in perfect condition throughout, mileage 3,700, trip speedometer, lamps, horn, generator, tyres as new, 2 Dunlop belts, spare valve; £32/10. Wilson, 3, Queen's Av., N.10. [6861]

**TRIUMPH**, 1913, 3½ h.p. T.T., Bosch, very little used, with light basket sidcar, new Dunlop belt, Millers lamps, tyres good condition; £22; seen after 5 p.m.—23, Macleod Buildings, Westminster. [6917]

**3 1/2 h.p.** T.T. Triumph, free engine, clutch, variable pulley, new lamps, tyres, and tubes, link belt Bosch mag., guaranteed perfect condition throughout, splendid appearance, horn, and all accessories; first cheque £27/10 secures.—F. Davy, 61, Edward St., Nelson, Lancs. [X383]

**TRIUMPH**, 1913, 3½ h.p., clutch, Dunlop tyres, enamel plating and plating good, £28/10; 1914, 3-speed clutch, just been renovated by the Triumph Co., complete with sidcar, Covey, P. and H. lamp set, and horn; £45/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X414]

## Vindeco.

**VINDECO Special**, with coachbuilt sidcar, 5-6 h.p. twin mag., F.E. clutch, wants overhauling; great sacrifice; £13/10.—Wandsworth Motor Exchange, Ebner St. Wandsworth (Town Station). [681]

## Williamson.

**WILLIAMSON** 8 h.p. Combination, w.c. Douglas engine, clutch, kick starter, all spares, (Covey) lamps, complete, splendid condition; £80. Wanted small car.—Rogers, Photographer, Wellingborough. [X400]

## Yale.

**YALE**, 7-9 h.p., 2-speed, 1915, sidcar, accessories; £55.—Fox, Horsley's Garage, York. [X410]

## Zenith.

**£22/10.—3 1/2 h.p.** Zenith Gradua and Sidecar.—Atte 7 p.m., 5, Alexandra Rd., Wimbledon. [680]

**ZENITH**, 6 h.p., 1913 combination, in exceptional nice order; £38.—Percy and Co., 337, Euston Rd., London. [694]

**1915 Zenith**, Gloria coach combination, counterbalance model, speedometer, hood and wind screen, luggage carrier, and spares; £60.—Jewell, 168, Archway Rd., N.6. [682]





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**The Petrol Position.**

**I**T is extremely hard to ascertain the real truth as to the petrol position at the present time. On the one hand it is rumoured that there is plenty of petrol in the country, while on the other one frequently sees the statement that the position is critical. It is an open-secret that many ships carrying the precious fuel to these shores have been sunk, but against that fact we have the figures relating to the imports of motor spirit into the British Isles in 1917. We are told that the total imports for the seven months of this year were not very considerably less than those of the first seven months of last year. This is for home consumption only, as it was stated in the House of Commons recently that petrol for the various fronts goes direct to the point of consumption and does not enter this country at all. The result is that there are many hundreds of thousands of gallons of motor spirit unaccounted for, and this after taking into consideration the ever-increasing requirements of the Army and the five per cent. of the total used by the private motorist.

We are approaching, if we have not actually reached, a state of prohibition, having almost attained that point at which motoring for other than purely business purposes is prohibited.

Now the result of this is more serious than is at first supposed. To the majority it seems that, leaving aside the fact that for city people motoring produces health and gives relaxation to a more beneficial degree than most other forms of sports and pastimes, the prevention of it inflicts no more than a slight hardship, which the patriotic ought to suffer patiently; but there is more in it than this. The demand for drivers is still great and is increasing: lady drivers are wanted, and men drivers are wanted, and it is obviously to the advantage of the State that these people, when their services are called upon, should be experienced.

The outcome of this demand has been that nearly all the experienced motorists are now employed in the Government's service, so that

any more who volunteer are inexperienced, or are only partly experienced. What is happening now is that the various motor schools are full up with candidates. A course of motor driving takes six weeks, and although at the end of this period the pupil is usually fit to undergo an examination for proficiency, he or she cannot be said to be so well qualified to take charge of a motor vehicle as one who has owned and driven a motor vehicle for some time.

The same remarks apply to the motor cyclist. The motor cyclist does not go to a school for his training: he learns in the hard school of personal experience, and if the means for teaching himself are denied him he has to undergo his tuition at the hands of the Army—which is the very last thing the Army wants to undertake, as it will be noticed that all demands for motor cyclist recruits specify that the men should have had at least two years' experience.

It is to be feared that a good deal of the outcry against motoring at the present time is due to an anti-motorist feeling among certain sections of the community, and we think that those in authority should bear in mind that the total prohibition of motoring for pleasure will do more harm than good, provided there is enough petrol to go round. If there is not, we ought to be told frankly the position. Nothing would be gained by the enemy if this information were published. Unfortunately, Germany knows pretty accurately the number of tank steamers sunk, just the same as we knew how serious was the petrol position in Germany in 1915, when the Russians occupied all the oil wells which supplied her. Germany, however, was fully alive to her difficulties and prepared to meet them, with the result that home-produced fuel was quickly available and was sufficient for the needs of the Army: we refer to alcohol mixed with benzole.

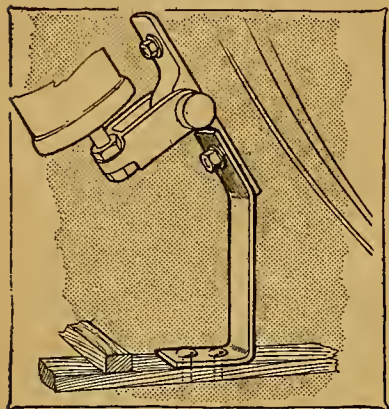
It is to be hoped that the authorities will take due cognisance of these facts, and seek to encourage, so far as lies in their power, the private owner, and to issue him a little—if only a mere pittance—of petrol.



## Luggage Carrier for B.S.A. Outfit.

A Home-made Spring Carrier at a Cost of Four Shillings.

**A** CHEAPLY-MADE, but at the same time very efficient, luggage carrier has been constructed by the owner of a B.S.A. sidecar, who recently brought it before our notice. The carrier fully answers all requirements in the way of capacity, strength, and freedom from complications, while



Method of fixing the suspension plates to the body of the sidecar.

another good feature is that it can be attached or detached within three minutes.

The platform consists of oak, the two main members being  $2\frac{1}{2}$  in. wide and 1 in. thick, the cross pieces being 1 in.  $\times$   $\frac{3}{4}$  in., bolted together with flush-headed  $\frac{1}{4}$  in. iron bolts.

A point which will appeal to the discriminating motor cyclist is the fact that the carrier is attached to the sidecar body, the result being that it is efficiently sprung and free from the excessive vibration which arises when fixed to the chassis, and this is effected without disfiguring the body.

The rear attachment is made of two pieces of  $\frac{1}{2}$  in. flat iron or steel  $1\frac{1}{2}$  in. wide and shaped as in sketch.

At the back of the body of the sidecar are two plates, each fixed by two bolts, which suspend the body to the springs. The lower bolt on each side is removed, and when the plates on the carrier are registered the bolts are first passed through these and then replaced in their original holes, tightening inside the sidecar.

The other end of the carrier reaches a point well under the sidecar. Holes are drilled through the bottom, also the carrier, and the two bolted together. When fixed up it makes an exceedingly strong and workman-like job, and the writer stood on the attachment and tried to break it, but without effect.



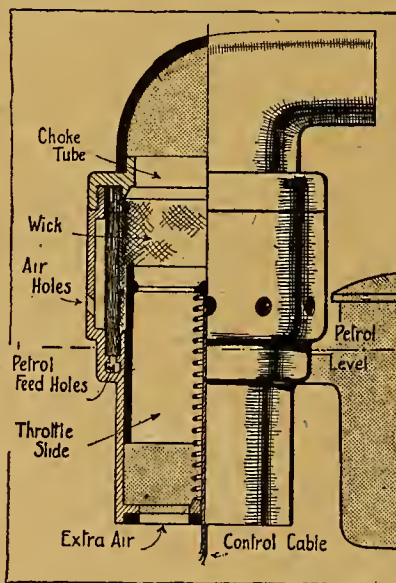
The B.S.A. sidecar fitted with the home-made luggage-grid. An advantage this grid possesses is that it is suspended from the body of the sidecar, thus being insulated against excessive road shocks.

The cost at the outside should not exceed 3s. or 4s. for material.

## A Simple Wick Carburetter.

**W**E have received the accompanying drawing of an interesting wick carburetter from Pioneer Motor Cyclist W. A. Fitch, who has been experimenting with it for the past three years.

Very little description of the instrument is necessary, though we may say for the benefit of the uninitiated that the principle of a wick carburetter is to carburette the fuel by absorbing it in a wick, across which or through which air is drawn at high velocity. Surface vaporisation therefore takes place, and it will be seen that with this type of carburetter there is less likelihood of wastage by drawing a wet, badly carburetted mixture into the engine than with the spray or jet variety. Wick carburetters were used successfully in the early days of car design—the Lanchester being an excellent example of the type—and there are still many engineers who retain the view that, on account of its simplicity and economy, the wick carburetter will yet hold its own against the more mechanical instrument.



The Fitch wick carburetter, the principle of which is described in the text.

The accompanying drawing is, perhaps, self-explanatory. The porous wick, which is easily renewable, is fed from the float chamber, the bottom extremity of it resting, as it were, in a circular bath of petrol. The metal barrel or carburetter body surrounding the wick is freely drilled to admit air, while on the inside of the wick is the throttle piston, which covers or uncovers the wick according to the throttle opening, this regulating the mixture fed to the engine.

It will be observed that the throttle piston is hollow, extra air being drawn through the centre of it, while the extra air holes at the bottom of the carburetter body can be adjusted as to the quantity of air they admit.

Probably this design would be improved if a filter were incorporated to purify the air before it gains the wick—rather than leaving the wick to do the purifying. A fine wire gauze of considerable area, which would also prevent "blow back," could easily be arranged to surround the whole mechanism.





### American v. British Machines.

IT is not particularly graceful to initiate a comparison between our own motor cycles and those of our latest Ally just when our national debt to her is so heavy, but I will endeavour to avoid giving offence by restricting myself to the academic aspects. It is quite easy to see why American and British machines have developed on different lines. In America there were—and are—far more obstacles in the rider's path than in England—steep hills, bad roads, sand, and so forth. Again, our road system was highly developed before the motor era began, and if we preferred, we could always circumvent an obstacle, whereas the American motor cyclist had to surmount it. Until quite recently both industries, and in particular the American industry, relied on single gears. In conquering obstacles one must depend either on high engine power or low engine gearing. The limits of low gearing with a single ratio were tolerably settled by technical considerations, and weight fixed limits to engine power. So America, faced with serious, numerous, and undodgable "obstacles," developed the 7-9 h.p., and we developed the  $3\frac{1}{2}$  h.p. In spite of what 7-9 h.p. enthusiasts may say, the  $3\frac{1}{2}$  h.p. was *not* selected by an arbitrary fiat of the trade, but by a referendum of the general riding public, who made their preferences unmistakable because they dislike unnecessary weight.

### The Advent of Variable Gears.

THE variable gear flooded the U.S.A. market somewhat later than our own, and it offered the American manufacturer his first opportunity of making a choice. It was open to him to begin making a  $3\frac{1}{2}$  h.p. with a low emergency gear, but he elected to carry on with the 7-9 h.p. for a variety of reasons, among which I may mention the following:

- (1.) He knew how to make a good 7-9 h.p., but did not know how to make a good  $3\frac{1}{2}$  h.p.
  - (2.) Sidecars were growing popular, and if we need a big twin for sidecar work on British roads, *a fortiori*, the Yankee rider needs a bigger.
  - (3.) His public were beginning to clamour for certain heavy fittings, especially in the way of increased comfort and lighting installations.
  - (4.) Owing to the badness of American roads, the average American rider belongs by emphasis to the youthful, athletic sportsman type. This type of rider values speed and power more than most things. The British market has long since overflowed this class: the American market has scarcely begun to do so. The American who is getting on in years does not plump for a machine which requires riding and handling, and knowing that most of his jaunts will involve trick stunts through loose sand and among ruts, he goes in for the quantity-produced car in preference to the two or three-track machine.
- For these reasons the American trade was perfectly justified in concentrating upon the 7-9 h.p. class.

### Future Developments.

AFTER road efficiency comes handiness. Therefore the typical American machine will tend to approximate more and more to British patterns, and to grow lighter as American riding conditions improve. For the moment, British machines, as a class, evince retrograde tendencies, for they are becoming heavier. This is due to three main factors, viz., (a) the desire for spring frames, due to the crumbling up of our obsolete road system under stresses which it was never designed to bear; (b) the temporary popularity of the sidecar; (c) the superior attraction of heavy electrical lighting systems over their lighter rivals. This tendency is only an interruption of the lightening process, not its reversal. Other things being equal, the lighter machine will always be the better seller. Indeed, the vast majority of users are ready to compromise and sacrifice other advantages to obtain roadworthy lightness.

### Personalia.

I AM not yet old or lazy enough to put handiness in the absolute forefront. I love speed, I hate road vibration, I loathe engine vibration, and unquestionably a huge twin is attractive on all these counts. It can eat up a road with a minimum of fuss, and it ignores all ordinary hills. As its big engine achieves speed on a high gear and limited throttle opening, it is tolerably devoid of engine vibration, and it laughs at the additional weight of a real spring fork, 3in. tyres, and a couple of cantilevers flanking the rear wheel. But I can secure all my points on certain British machines, which weigh a cool hundredweight less, and therefore my patriotism is hardly appealed to in the matter. If we underline the value of *handiness*, which is the first and last demand of thousands of buyers, the folly of implying that the 7-9 h.p. (British or foreign) stands supreme is evident.

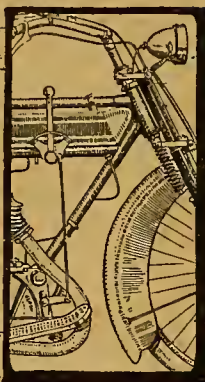
### Light Springing.

LIGHTNESS in connection with an efficient spring frame is probably the chief desideratum of the home market at the present moment, and it will certainly be difficult to encompass and open the door to imported machines. It is not easy to keep a spring frame machine light, and if you dab full springing on a 2 h.p., a  $2\frac{3}{4}$  h.p., or even a  $3\frac{1}{2}$  h.p., you are very liable to rob the machine of its handiness, till it needs treating in much the same tame elephant fashion as a big twin. But no such handicap exists in the case of a monster, which already scales  $3\frac{1}{2}$  cwt. or thereabouts. You always approach it, when it is at rest, in much the same mood as you begin rolling the lawn or shifting the office safe to a new corner, and in neither case does an extra 50 lb. or so matter a tinker's cuss. But if you graft 50 lb. on to a Baby Triumph you spoil it, and that's just going to be the bother for a year or two.



## A Power Unit without Magneto.

A Unique Two-stroke working on the Diesel Principle



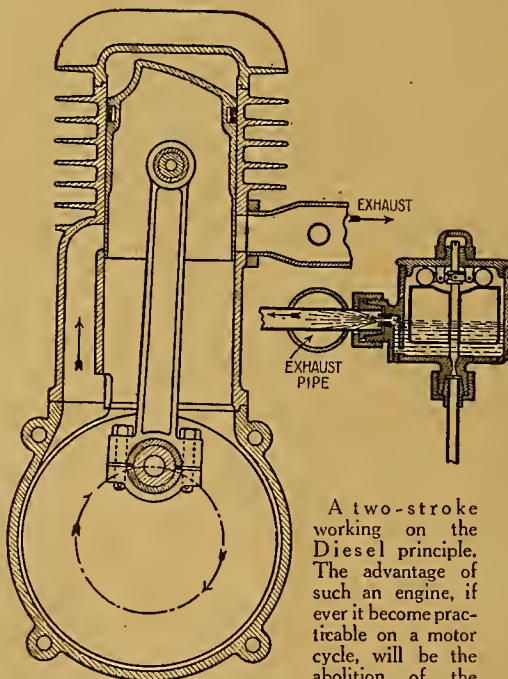
SINCE the advent of the Diesel engine, motor cyclists have constantly speculated on the possibility of a power unit on similar lines, by which both the magneto and carburetter could be dispensed with. The advantages of such an engine are obvious on the face of things; not only would the cost of manufacture be very materially reduced, but we should have a unit which, in itself, was the very essence of simplicity.

The unit to be described is the invention of Mr. H. E. Beyer, and though in its present stage it may appear to possess certain defects, there is no doubt that the design contains a germ of possibility in the direction of the simplest type of internal combustion engine. The advantages claimed by the inventor are:

1. Entire absence of any electrical or other ignition device, ignition being effected solely by compression as in the Diesel engine.
2. Means of perfectly regulating fuel and air proportion without the use of a carburetter.
3. Greatly improved scavenging; the power cylinder scavenged by air only, eliminating wastage of petrol through the exhaust ports and by condensation. The volume of air used for scavenging cylinder is in excess of the working volume of the cylinder, so that a quantity of air is allowed to pass with each stroke through the exhaust port; the fuel not being admitted until the piston nears the top of the compression stroke.
4. Increased efficiency owing to higher compression.
5. Cheapness of manufacture.
6. Satisfactory for using paraffin, petrol, benzole, or alcohol.
7. Reliability owing to absence of ignition device.

### How the Engine Works.

The engine illustrated consists of a single power cylinder and a fuel compression cylinder; gaseified fuel is admitted to the latter, while air only is admitted to the power cylinder by the transfer port.



know it, and also the magneto. The small drawing shows the float chamber with flash tube passing through the exhaust to the compression cylinder.

The expulsion of exhaust gases and the inlet of the new charge of air are effected in the usual way. It will be noted that the power and compression pistons are at the bottom of the stroke at the same time, thus a larger quantity of air is drawn into the crank case than in ordinary practice, for on the upward stroke a charge is drawn into the crank case equivalent to the displacement of both pistons, while on the downward stroke this increased volume of air is forced into the power cylinder, a portion of it (theoretically equivalent to the displacement of the pumping piston) overflowing at the exhaust.

Let us follow now the working of the engine. As the power piston nears the bottom of the power stroke, the highly compressed air in the crank case sweeps into the cylinder, forcing out the burnt gases at high velocity. At the same instant a jet of gaseous fuel, flashed into vapour by the heat of the exhaust, is drawn into the compression cylinder, which begins to move upwards in unison with the power cylinder. As the air port of the power cylinder is closed, simultaneously the fuel port in the compression cylinder is closed. Both pistons move upwards in unison, the power cylinder compressing pure air, the compression cylinder compressing pure gas. As the compression cylinder reaches the top of its stroke it automatically taps open the valve interconnecting the two cylinders, thus allowing the gas at exceedingly high pressure to join the compressed air in the combustion head of the power cylinder.

It will be seen from the drawing that the pure fuel gas in the compression cylinder is compressed to a much higher pressure than the air in the power cylinder, otherwise it would not pass into the latter. The compression of both cylinders is so high as to cause instantaneous combustion as the inflammable gas meets the compressed air in the combustion space.

On the downward stroke—the power stroke—a vacuum is caused in the compression cylinder.



**A Power Unit without Magneto.—**

der, and at the bottom of the stroke the gaseous fuel is admitted to this vacuum. Vaporisation, be it noted, is assured not only by the introduction of the spray into a vacuum, but by the heat of the tube in which the fuel is sprayed—this tube passing through the exhaust pipe at its hottest point.

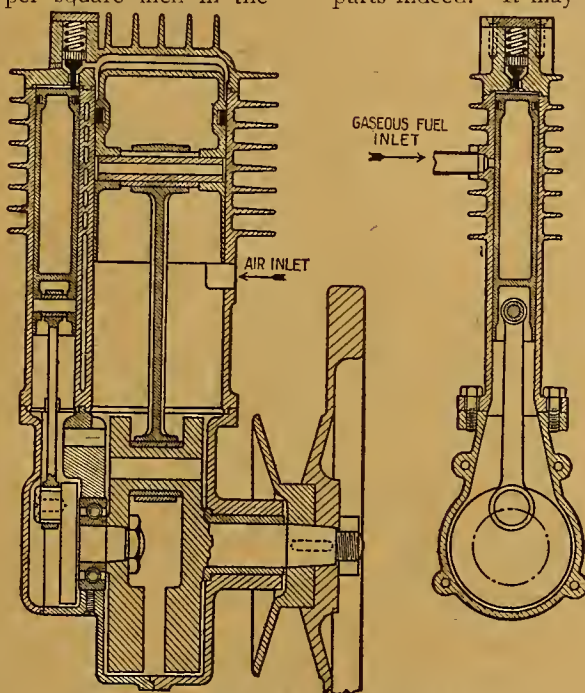
**Pressure and Ignition.**

Automobile compression pressures have always been governed by the fact that beyond a pressure of approximately 120 lb. per square inch, petrol or paraffin gas when mixed with air will cause pre-ignition. The engine under review is designed to obtain a pressure of 150 lb. per square inch maximum in the power cylinder, and 250 lb. per square inch in the compression cylinder. The proportion of fuel and air, and also the regulation of the engine, are effected by means of a throttle valve in the gaseous fuel pipe, and by means of a throttle valve in the air supply port to the crank case. It is claimed that the pressure in the compression cylinder being so high, the act of throttling down will not sufficiently reduce the pressure to cause defective running. Taking, say, petrol as fuel, the usual proportions worked to are one of petrol to eight hundred parts of air, measured by volume. Taking the gaseous fuel on admission to the compression cylinder at 120° Fahr., and at slightly below atmospheric pressure, and the air at normal temperature and pressure, the proportion of fuel to air by volume is 1 lb. to 42 lbs. With this it is conceivable that the compression cylinder used, although small, is adequate.

**A Fixed Ignition Engine.**

It would seem with this type of engine the chief difficulty would lie in starting, though the inventor claims that no great difficulties are anticipated in this direction. He points out that in the down stroke of the compression piston the lift of the small valve is so slight that only a negligible quantity of gas is retained in the pumping cylinder. This quantity, he claims, is sufficient, when the engine is cold at starting, to carry the fuel as vapour for the first power stroke, the exhaust from which immediately assists in vaporisation; thus no special provision has been made for gasifying fuel for the first stroke.

It will be noted that no allowance is made for varying the point of ignition. A decompressor has not been shown, but this would be added to a motor cycle engine. It may be added that a single-cylinder engine on the lines described will very shortly be completed, and the results of a trial will be available.



(Left) Sectional drawing of the Beyer engine.  
(Right) Section of pumping cylinder in which the gas is compressed before entering the power cylinder.

**DR. LOWE'S CRITICISM.**

The design is by no means novel; it simply consists of a slightly different method of using a pump cylinder of sufficiently high compression to ignite the charge by its own heat when injected into the air. If to control the engine this pump pressure is reduced, it is not really accurate to say, as is claimed, that the combined temperatures would be enough to ignite the charge, because the expansion of fuel vapour into the working cylinder will naturally reduce its temperature rapidly; the ignition will be extremely rapid if it is to be effective, and as the fuel is in the form of a liquid the rising pressure would probably be more rapid than that of the Diesel engine, necessitating very heavy parts indeed. It may be pointed out that, although it

would probably be extremely efficient as regards petrol consumption, efficiency for motor work must be considered as all-round efficiency; a method of timing the ignition is, therefore, absolutely necessary.

It must not be forgotten that only a certain amount of petrol can be consumed, and as there are no means of obtaining the ignition temperature the engine would be very uncontrollable, and would probably only be controllable at one speed, during which time it would be efficient as regards consumption only. The gas must come in nearly all at once to obtain quick ignition in this system; the pressure will rise almost instantly, giving a very uncontrollable engine, and if the engine were very much throttled down in the manner suggested it is possible that, unless the compression were excessively high, the temperature might be sufficiently reduced to prevent ignition, and in this connection the addition of a small igniting apparatus or direct mixing apparatus for the air and petrol would be an improvement.

**The Value of the Principle.**

The fact that the invention is not novel does not detract in any way from its cleverness, which is undoubted, or from the value of the principle, which, under many other patents covering the past thirty years, will undoubtedly supplant the carburetter in years to come.

As far as using other fuels is concerned, it must be remembered that the temperature is varying with the compression, and therefore cracking will take place in different degrees, leaving, for example, the whole of the tarry and pitchy matter in the delicate pump cylinder. As far as its thermal analysis is concerned, the engine is largely comparable to a hot bulb semi-Diesel two-stroke.



# ROAD TEST OF NORTON EMPIRE MODEL.

Practical Road Notes by a Practical Rider.

**W**E were told that every machine in the crowded ranks of the Norton finishing shops was up to a certain standard, and in support of this statement we were invited to visit the works at any such time as our fancy dictated—"Pick any machine from the rank, push it to the door, give the kick-starter a dig, and away you go two or three hundred miles as you choose, subjecting the machine to any fair test you can think of."

This is the sort of sporting offer one does not like to turn down, and accordingly one stormy July evening we strolled into the Norton factory, selected the last machine in the last rank, and ten minutes later were threading our way down the dense and erratic traffic of Bull Ring.

It may be mentioned, *en passant*, that that glib sentence about "give the kick-starter a dig and away you go" did not pan out just in text book order. Those whose riding is mainly confined to the use of "small twins" may lose the art, or they may fail to develop those partial biceps necessary for boosting round a hefty single. At all events it required more than one rather feeble effort ere we were greeted by the good old Norton bark, and we would suggest that some ever ready primary device—quite apart from the pilot—would be appreciated by the aged and weak-kneed.

The model which is here to be discussed is the Norton Empire model—the machine built for the military requirements of to-day and the Overseas rider of to-morrow—the Norton 4 h.p. all-chain (totally enclosed) big single. It is in every respect cut out for strenuous and unsparing use—a rough country, go anywhere, double-purpose machine of absolute reliability. It is not designed for speed, but both in power and strength of design a wide margin is left for the most extreme conditions, and during the comparatively short period the machine was in our hands we were able to form the opinion that no amount of deep sand or merciless mud-plugging—real mud-plugging—would cause this very practical mount to fall off in power. Let it be quite clear, then, that the following notes do not refer to the  $3\frac{1}{2}$  h.p. speed model Norton. Be it further understood that by the employment of higher gear ratios, this mount would make an ideal solus for those who love a "single" capable of taking a really high high gear.

The machine we rode will probably be ploughing its way, in a month or two, through the axle deep mud of the Eastern front, handled by a clumsy rider, and the gear ratio being decided for such work, it is only natural that, on our smooth highways, it seemed absurdly low geared, considering the abnormal kick of the engine. Given a 4 to 1 gear and judicious finger-

ing of the clutch, very short shift could have been made of the long level stretches, for the engine proved capable of attaining and maintaining a high rate of revolutions. In traffic the manner in which it would tick over on top gear, the clutch slightly eased, was distinctly pleasing, while naturally it proved capable of quite unusual acceleration—an ideal traffic machine.

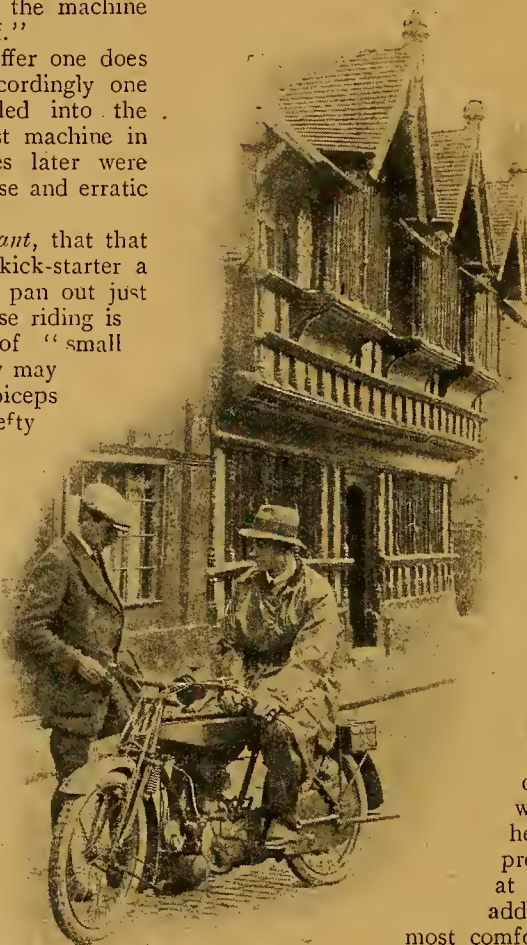
## Comfort and Reliability.

A fair mileage was covered on ordinary business rounds, during which we were able to sum up the general qualities of the Norton. As regards the all-chain drive, no necessity was felt for a friction shock-absorber except when bad riding was indulged in. If the clutch caught up unexpectedly at low speeds, if the mixture or the gears were muddled, then a distinct snatch in the solid drive was experienced, but owing to the heavy flywheels and the low compression no harshness was detected at any other period. It may be added that the riding position was most comfortable and the control excellent, though the incorporation of a half-compression device in the valve timing mechanism is, we consider, a necessity. We can picture the uninitiated Cossack attempting to start this mammoth amidst the Russian snows with the temperature hovering about the zero point and the roads heavy with snow or glassy with ice.

During the preliminary tests the petrol consumption worked out at approximately 65 m.p.g. on short journeys, with much traffic riding and stopping and starting work. This would probably approximate 80 m.p.g. straight riding, and the jet was decidedly on the large side.

## A Hill-climbing Test.

Stoneleigh is not much of a test for such a machine, but thither the Norton was ridden to be put through



The 4 h.p. ( $82 \times 120 = 633$  c.c.) Empire Norton under test. This model was fully described in the November 30th issue of *The Motor Cycle*, and is identical with those built to the Russian Government's order.



**Road Test of the Norton Empire Model.—**

its paces accompanied by a flat twin designed somewhat for speed. On its top gear of 4.96 to 1 the Norton proved capable of 45 m.p.h. all out, and its most noticeable period of vibration was between 32 and 37 m.p.h. If at these speeds the throttle were closed or partly closed the vibration was very noticeably increased—points which were due to the unnecessarily low gear, which enabled the big engine to “over-run” itself. With a family sidecar attached, two tins of petrol, luggage, etc., on the grid, and a lusty ten year old youngster on the carrier, the gears would have been about right, but ridden solo the machine was seen at its worst. Suitably geared a speed of well over the fifty mark would have been easily obtainable.

**The Norton as a Hill-climber.**

Stoneleigh was taken without any opening of the throttle and without falling off in speed. On its present gear a sidecar of normal weight with passenger would make no perceptible difference to the speed capabilities of this mount.

As a speed test the hill with its maximum gradient of 1 in 9 is too short and insufficiently steep to be of value in testing such a machine. The Norton, on its top gear, would ascend at a crawl on the merest whiff of petrol, whilst at the slightest opening of the throttle it proved capable of instant acceleration on the steepest portion and without the least suggestion of knocking or labouring. Later the machine was driven all out for several miles, run for some minutes at the foot of the hill with magneto retarded and engine free, jerked into top gear, and subjected to yet another slow climbing test which it performed without

knock or suggestion of heating. The hill for the first eighty yards was ascended on top at about 8 m.p.h., then the throttle was thrown open, whereupon the engine picked up cheerfully, as though fresh from the garage doors.

**An Ideal Overseas Mount.**

Meeting a group of Triumph testers on the top of Stoneleigh, the men were much interested in the Norton, and running comparisons between the two well-known makes—favourable and the reverse to both—prevailed. We enquired of the testers if they knew of a worse gradient—something really tricky—and were referred to the bank which rises almost perpendicularly for twenty-five feet or more from the roadside at the hill top. This murderous little ascent, with its wooden palings at the top, has more than once been tackled by Triumph testers, but as we were desirous of returning the Norton to the factory in something like the condition we found it, the experiment was not attempted.

Finally, it may be added that we consider this machine in every way suitable for Overseas requirements. The unusually liberal ground clearance, all chain drive with excellent enclosing cases, and the steady pulling, untirable engine render it specially adapted to the hardships of pioneer roads. The machine throughout is extremely strong, mudguard clearance is good, and it is particularly suitable for double-purpose requirements, the hard pulling of the engine at low speeds being remarkable. It is unnecessary to add that the fittings and the design throughout are excellent, and that a ready market will await this serviceable mount cannot be doubted.

## AN EARLY SPRING FRAME.

**A Practical Design of Ten Years Ago.**

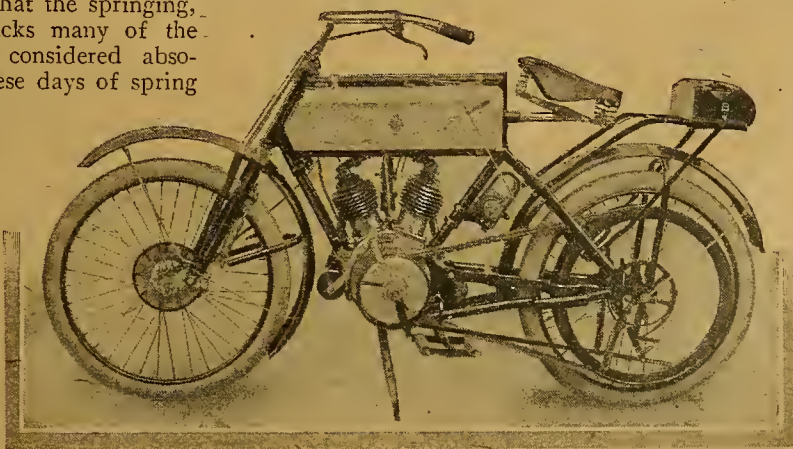
THE accompanying photograph of the spring frame Bat motor cycle, which made its appearance some time prior to 1907, was unearthed by the proprietor of Maude's Motor Mart when looking through some old papers a short time ago.

It will be observed that the springing, though ingenious, lacks many of the features which are considered absolutely essential in these days of spring frame design. How the vertical rigidity of the front wheel is retained it is difficult to gather, nor is it easy to decide from a study of the photograph exactly how the rear springing mechanism operates. Apparently the spindle of the wheel and the U piece passing over the wheel com-

prised the unsprung portion of the frame, two vertical coil springs, which occupy their perilous positions on either side of the wheel, insulating this unsprung portion from the rest of the frame.

In writing to us regarding the invention, Mr.

George Pettit states that he does not submit the photograph as a model of elegance, but that at the same time he can vouch for its comfort, apart altogether from its tendency towards side-slip on wet roads due to the lack of lateral rigidity in both wheels. The machine certainly does not appeal to one as a type for negotiating greasy roads.



A very early spring frame Bat. Though curious in appearance it was comfortable riding. Its fault, as may be imagined, was a tendency to side-slip on grease.

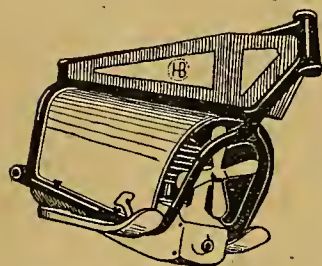


# A NOVEL FOUR-CYLINDER LAYOUT.

## A French Reader's Unobtainable Ideal.

THE illustrations appearing on this page show an attractive design of four-cylinder machine, the work of a French reader, M. Henri Boursiac, who writes us that this is his ideal type of mount, but one which, like many ideals, is unobtainable. The general layout of the machine is certainly very taking, and many of the points of design are distinctly ingenious. The specification is as follows:

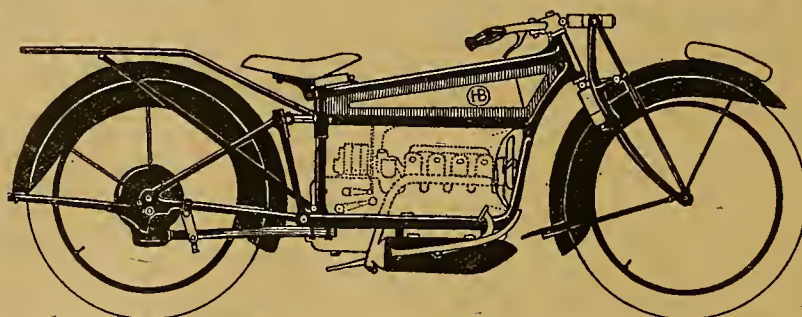
The engine is a four-cylinder two-stroke with the gear box cast in unit with the crank case. The cylinders are air-cooled and enclosed by an artistically-lined shield or cowl, which protects the rider's legs from heat and spray. At the end of this cowl, facing forwards, a four-bladed fan is placed, this being positively driven from the engine, and so arranged that a powerful current of air is carried through the enclosing shield. The cylinders are cast in pairs, only one detachable head for each pair; thus the simplicity and accessibility of a twin-cylinder engine is obtained. M. Boursiac suggests an automatic one-lever carburetter and a magneto-dynamo for ignition and lighting.



The bonnet and the four-bladed fan fitted to assist engine cooling.

The frame design appears to be excellent. It will be observed that the engine is slung in a cradle, the

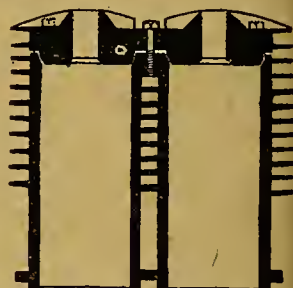
frame being duplex from the middle tube downwards. It is sprung fore and aft. The rear springing, though not remarkable for novelty of conception, appears to promise a fair degree of rigidity, and the comfort of



A design for a four-cylinder motor cycle submitted by a French reader. It has many attractive features, and the layout is decidedly pleasing.

the rider is added to by a new type of cantilever saddle supported by one enclosed coil spring. The front springing is certainly interesting, and though at first glance reminiscent of the Triumph system, the distribution of the springs is differently arranged.

Long coil springs, contained in dust-proof and grease-packed cases, are used, and the design, though clever, appears somewhat experimental. Three speeds, of course, are provided, the clutch being of the dry plate variety, easily adjustable, and foot and handle-bar controlled. The helical drive to the rear wheel is entirely enclosed, the universal joint being in a gritproof case. M. Boursiac plumps for 28in. x 2 3/4 in. tyres. The semi-T.T. bars are adjustable; the carburetter and magneto controlled by twist grips, thus reducing the number of handle-bar levers. Pressed steel folding footboards are suggested, both brakes operating on the rear wheel. No doubt this clever design will tempt other readers to advance their views as concerns the ideal post-war mount.



A pair of cylinders cast in one piece with only one detachable head for the two.

## Reliability Trial in South Australia.

THE annual reliability trial of the Motor Cycle Club of South Australia was held on 2nd and 4th June over a distance of 240 miles. The first half-day's run was over good roads and in fine weather. The second day, however, was wet, and part of the distance being over unmade roads the riders had a sample of riding under the most strenuous winter conditions. Besides points being lost for breakages, one point was deducted for every fifteen seconds early or late at each control, of which there were seven, two of them being secret. The results were as follow:

1. A. N. Smith (Harley-Davidson sc.) .....	points lost	27
2. J. R. Day (Harley-Davidson sc.) .....	"	87
3. V. P. Elliott (Elliott two-stroke) .....	"	100
4. R. Brown (B.S.A. sc.) .....	"	110

5. H. Warren (Lewis two-stroke) .....	points lost	298
6. H. C. Rainsford (Indian sc.) .....	"	424
7. C. W. A. Korner (Indian) .....	"	592
8. J. Smith (Harley-Davidson) .....	"	677
9. L. Benisch (New Hudson sc.) .....	"	864

C. S. Lindsay (Douglas), C. Lindsay (Lewis), W. H. Hubbard (J.A.P. sc.), L. R. Buckeridge (Indian sc.), F. W. Cook (Indian sc.), H. U. Johnson (Hazelwood sc.), G. F. Hayes (Harley-Davidson sc.), and E. Ferguson (Indian) retired at various stages of the contest.

### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.





## OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

### Universal Petrol Scarcity.

THE petrol scarcity promises to become universal. Recent news from America signifies this, and if America becomes short of petrol a goodly portion of the world will suffer the same irritating and irksome restriction. We, in England, have learnt to eke out our slender supplies in various ways, and the everyday motor cyclist who must remain on the road has been called upon to think of the best ways and means by which this tiresome performance can be accomplished.

During these times, when sacrifice and privation are the daily order for so many, it ill behoves us who are privileged to remain quietly at home to complain simply because the open road is not quite so open as it used to be. It remains with us to carry on as best we can. All we ask is a straight story and the fulfilment of promises; but we would point out that, in these days when the future is a matter of lurid haze, those who are to decide the petrol question in the domains of the Allies Overseas would do well to avoid promises or anything that might possibly be misconstrued as such. In Britain we have already seen that anything in the way of a promise may cause the truly patriotic to suffer, while those who have few scruples suffer least. The future is not in the hands of any one tribunal, therefore promises are a matter of speculation.



### The Question of Cubic Capacity.

RIDERS who are unacquainted with the general order of things in our Overseas Dominions express wonder that big engines enjoy such popularity in those regions. We have our small, highly-efficient engines which, on our roads, give unqualified satisfaction, and the opinion of the average British rider is that they would fill the bill equally well for the man Overseas. But not only are the conditions of riding vastly different in our Dominions, but the light in which the pastime is viewed is equally distinct. The Overseas rider does not want a small "revving" engine—not so much on account of its low power, but on account of its lack of stamina. He demands an engine which, after four months of rackèet and bad handling, will still carry him through—an engine which, though it lose 50% of its tune, is still good for a speed burst, which is only limited by the condition of the road surface encountered, and which, after months of hard slogging, retains its tune sufficiently to meet his daily requirements.

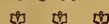
The majority of riders Overseas regard their machines purely as business propositions, and the universal mount should be one which is in no way dependent

on decent tuning, but which can be depended upon to slog away with an adequate reserve of power for long periods at a stretch. These salient features can only be obtained on the large, low compression, side-by-side valve engine which is running constantly on top of its load.



### The Efficient Flat Twin for Overseas.

IT is an open question as to whether the overhead valve, highly efficient, high-speed engine is suited to the requirements of those whose riding is chiefly over rough country. As regards reliability, this type of engine—it being taken that we refer to the overhead valve flat twin—leaves little to be desired, though it certainly requires more adjustment and demands more delicate handling than the low compression touring engine. It is also more particular as to the plugs it uses; and while with an ordinary touring mount one never gives a thought to these important members, one very soon begins to learn things about plugs with the high speed engine. The valves, too, require watching for adjustment, but quite apart from the matter of hardness, the efficient flat twin machine is seldom so easy to handle as the side-by-side valve variety. The main ambition of this type of engine appears to be the accomplishment of most astounding "revs." It will not tick over on full load for long periods at a stretch, as an Overseas mount *should* do. Under such treatment it appears to become irritable, and a shade unmanageable and harsh. To put the matter in a nutshell, this type of engine is a delightful proposition on roads where the rider is able to "keep up the revs," change early, and has not constantly to pick his way; but when the going is difficult the successful riding of such a machine demands constant twiddling of the levers and very delicate manipulation of the clutch; *i.e.*, skilled driving. In this country it is a mount for the skilled rider *only*, and Overseas it would be very much more so.



### The Side-by-side Flat Twin.

THE above remarks apply only to the overhead valve flat twin, and do not bear in the least on flat twins as a whole. If we are content with two cylinders the flat twin will undoubtedly supersede the V twin on account of its superior balance and torque, and because it is in every way superior as an engineering proposition. And so, though the highly efficient variety with overhead valves is not particularly cut out for rough country work, we shall undoubtedly see the big engined side-by-side valve, low compression type of horizontally opposed enjoying wide popularity as a universal mount ere many years are out.



## A Selection of Letters from Readers scattered all over the World.

### Control Levers.

O. VIAZEMSKY, Petrograd, writes: "Being in need of a new carburetter control for my motor cycle, and not being able to purchase one, I decided to make one myself."

"As the roads out here, even main ones, are now in an appalling condition, owing to war traffic, ordinary control levers are not at all satisfactory, as the levers themselves are very stiff, and are fitted with hard little knobs at the ends, which very soon numb one's fingers and ruin the stoutest of gloves. So I made mine out of  $\frac{1}{8}$  in. spring steel, about  $\frac{3}{4}$  in. wide, tapering a little towards the ends. To these I fitted little padded cushions, made out of an old glove finger filled with insulating tape (rubber would do very well).

"The result was quite an eye-opener, and now I am able to adjust my engine to all the variations of the road surface without being at all inconvenienced by the vibration, as the levers themselves perform the duty of shock absorbers. I wish *The Motor Cycle* every success."

[Had our correspondent fitted weaker return springs to the carburetter pistons he would probably have experienced no stiffness in the working of his levers—taking it, of course, that the pressure on the friction plates was correct, and the wires working freely.—Ed.]

### Advantages of a Governor Pulley.

From "JIMBILL," Adelaide, South Australia: "I climbed across my first motor bicycle in 1903. It was a 2 h.p. Minerva (clamped to the down tube), and was a dinkum engine (still running). I remember the controversy anent the a.o.i.v. and the m.o.v., when Mr. Wells—who was then a Vindec man, I think—said he preferred the a.o.i.v. to the side-by-side m.o.v. I wondered if he got 'borak' poked at him when the Indian changed the position of its intake? I also remember Brice and 'The Brown' when they thought he used picric acid. It is a queer thing, I always associate 'Ixion' with Brice; I (without reason) thought them one and the same man. There are many things I could write about, I reckon, but with the war on a man dislikes to do so; but I just want to ask, concerning the ink spilling over the merits of the baby and the flat buzz-waggon as against the  $3\frac{1}{2}$  h.p. single, has anyone ever ridden a  $3\frac{1}{2}$  h.p. with only a frame and a pair of wheels, so to speak, driven from a Philipson pulley geared  $4\frac{1}{2}$  to 1? This is my mount, and 'Ixion' can have all his 'grids' that want special plugs, etc. Will 'Ixion' take his  $3\frac{1}{2}$  h.p. fixed engine, have a good run, come back, and attach a Philipson pulley, and then go out again? I am thinking he will not be so keen on his buzz-waggon afterwards. I am not keen on testimonials, believing in getting value for my money, but this pulley makes as much difference to the 'kick' of a motor as the British Empire makes to this war. The Philipson pulley does all that is claimed for it and more; I have proved that belts and tyres last longer with it, as do the bearings of the engine. I use a  $3\frac{1}{2}$  h.p. King Dick, Sun fittings, and it surely can skip. Here's handing you a bunch of flowers for the way in which you have run the paper through this disturbance; I take it regularly. Hooray for the bull-dog breed!"

### An Overheated Carburetter.

C. S. SAUNDERS, Calcutta, writes: "The following experience may prove interesting, and I hope useful, to some of your readers in the Colonies where the temperature in the shade goes up to 115° or above."

"Eighteen months ago I bought a second-hand 1913  $3\frac{1}{2}$  h.p. Triumph with three-speed S.A. hub gear. Not being satisfied with the consumption obtained by the standard carburetter, I purchased a 1915 model 3 jet Binks carburetter."

"The result riding solo was delightful, giving wonderful flexibility, speed, power, and low consumption. I rode the machine solo for a few months, and then put on a canoe-shaped wicker sidecar. Then the fun began!"

"The outfit would run splendidly for a mile, after which a mysterious misfiring began. The machine would miss once or twice, then go for a quarter of a mile or less, sometimes even more, firing regularly, then the same trouble recurred. This went on regularly, and there was a great falling off in power."

"I must here state that I am an engineer, and have made motor cycles and cars my hobby for the last thirteen years, so I am not a novice; moreover, I do all my own repairs, such as rebushing."

"Everything was tried, all combinations of jets, lowering the compression, all the best types of plugs, lowering the gear, and the engine thoroughly overhauled. The valves were perfectly free and correctly adjusted—ignition perfect."

"No one was able to solve the problem, and I was just going to sell the machine in disgust, when I noticed one day, having stopped after a run of ten miles, that there was a peculiar gurgling noise going on in the carburetter. I took off the gauze cover and opened the throttle wide, and saw that the petrol was boiling in the float chamber and spurting spasmodically from all three jets. As you know, the carburetter stub is a very short one, therefore the carburetter is close up to the cylinder."

"As a last resort I had a pipe made,  $5\frac{1}{2}$  in. long and 1 in. diameter, which I turned down on the inside to fit the stub, a driving fit being allowed. I also turned down the carburetter end of the pipe to fit the carburetter properly. I moved the oil gun round on the down tube to make room for the float chamber, and then, having fixed everything properly, I started up. The result was magical. All bubbling stopped, the carburetter only became slightly warm after running all out at 45 m.p.h., with sidecar attached and a total weight of 24 stone passenger load. The machine would cut down on top gear without snatching to seven miles an hour (the gear being  $5\frac{1}{2}$  to 1), and the petrol consumption, with the shade temperature at 103°, with sidecar and 24 stone passenger load, keeping up an average of 21 m.p.h., often against a head wind, worked out consistently to 80 miles per gallon. The jets were Nos. 0, 4, and 10. The machine romped up grades of 1 in 10 at 20 m.p.h. on top gear with the throttle only half open, and would do 45 m.p.h. with ease. There was no overheating, and the engine ran like a 6 h.p. twin."

"This is a true yarn, and as I had so much trouble and only solved the problem by accident, I think it is worth recording. This proves that a long inlet pipe, which, by the way, keeps very hot, coupled with a cool carburetter, is the ideal condition for power, flexibility, and good petrol consumption."

"Before closing I wish to say that I have learnt no end from your paper, which I have taken in since 1904, and always look forward to mail day when the English papers arrive."



AMERICAN ARMY IN FRANCE.

The United States motor transport service has been at work some time in the French lines. The drivers are almost all graduates of the Cornell University. The photograph shows the American motor transport waggonettes and American Motor Scouts now at work on the French front.



# Road Demonstration of Tilston Two-stroke.

A Meeting of Well-known Engineers and Interesting Discussions on an Unusual Phase of the Two-stroke Problem.

IT was quite like old times to be present once more at a gathering at which the faces of well-known engineers and erstwhile competition riders were present. The area opposite that popular rendezvous of pre-war motor cyclists—Stonebridge Hotel, between Birmingham and Coventry—certainly did not suggest the conditions of a petrol famine. On the day of demonstration it was occupied by a variety of machines ranging from the two-stroke lightweight to huge Cadillac and Daimler touring cars. The owners of these cars and cycles were men who had stolen a brief respite from what may be described as among the most trying labours of the war—that of the munition worker—men who, casting aside the old conservatism that once hampered our industry, were there to investigate the fruits of another man's labours, which, let us hope, will tend towards the advancement of what has now proved itself to be a potent factor in the strength of a nation's arms.

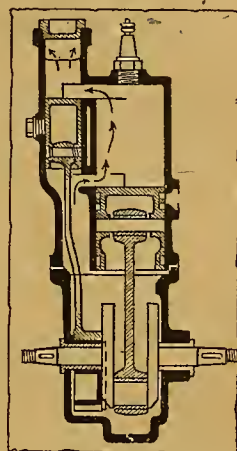
Mr. Tilston's genial invitation to lunch with him and to "see for ourselves" resulted in an excellent representation of the motor trade, especially that section of it concerned in the development of the two-stroke, such firms as the Triumph, Levis, Sun-Vitesse, Sunbeam, and Lea-Francis being represented, while among the motor cycles of interest was to be observed the new chain-driven Triumph, and (not a word) a spring frame Sunbeam (still in its experimental stage). After lunch Mr. Tilston produced working models of his piston valve engines, and though the chief object of the meeting was the demonstration of the piston valve two-stroke, a proposed four-stroke design working on similar lines was also brought forward. As the principle of Mr. Tilston's invention is probably little known, it will be as well to describe briefly the fundamental working principles of these

engines, which will appeal as entirely new to the majority of our readers.

## Description of Two-stroke Engine.

Taking, firstly, the two-stroke. In this engine a vertical valve cylinder of approximately half the bore and half the stroke of the working cylinder, occupies its place alongside the latter.

With the engine rotating the piston valve works in exact unison with the power piston, and is operated by means of a plain bearing cam on the crankshaft. At the top of this auxiliary cylinder is a port which communicates from the combustion head on one side and the exhaust on the other, while at the bottom of the working cylinder is an ordinary transfer port from the crank case.

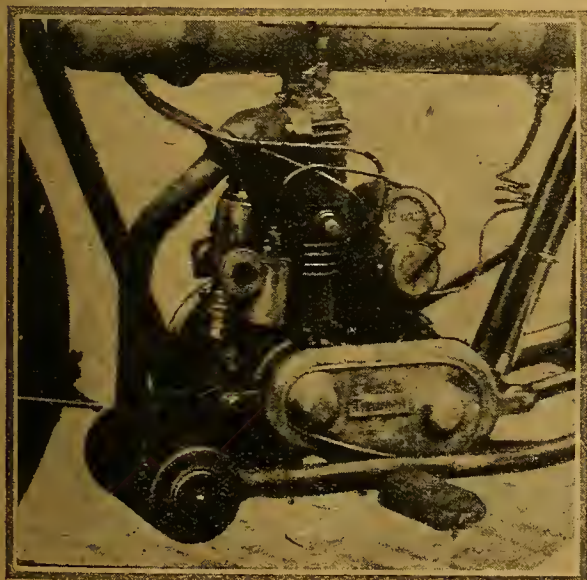


Diagrammatical section of the Tilston two-stroke engine.

Mr. Tilston is aiming at high volumetric efficiency and improved internal cooling. This, he argues, cannot be obtained when the inlet port and the exhaust ports are opposite each other, as in ordinary practice. He asserts the view—with which we do not necessarily agree—that the deflector on the piston head of the present-day two-stroke accomplishes its object only in a half-hearted manner; that, in spite of drawing board arguments, a great deal of good gas is swept out of the exhaust while a great deal of bad gas remains in the cylinder to be compressed—hence, high fuel consumption and four-stroking at low speeds. Thus, the volumetric efficiency of the present-day two-stroke is inevitably low. The volume of gas forced into the cylinder can, at the best, only be equivalent to the displacement of the working piston on its down stroke, so that a volume of bad gas theoretically equivalent to the capacity of the combustion head must remain in the cylinder after the period of exhaust. In the design of engine under review, however, the volume of gas swept into the cylinder is equivalent to the displacement of both the working piston and the valve piston, while scavenging is rendered efficient by reason of the fact that the fresh charge is forced in at the bottom of the cylinder while the exhaust is forced out at the top and at the other side of the cylinder, the top of the piston being flat so that the gases rush in and pass out without impediment of any sort. Immediately the piston starts on its upward stroke the piston valve closes, thus preventing overflow of the fresh gas from the exhaust port.

## An Internally-cooled Four-stroke.

So much for the inventor's expressed views as concerns the two-stroke. An idea of the four-stroke engine can best be obtained from the accompanying illustra-



Piston valve side of the Tilston power unit. Note the cap for withdrawing the gudgeon pin of piston valve.



## Road Demonstration of the Tilston Two-stroke.—

tions. On paper, this engine possesses unique possibilities. Firstly, the carburetter induction is opened up on a vacuum—i.e., when the piston has accomplished the greater portion of its down stroke, so that induction is effected by what can best be described as a "snatch" on the carburetter. Secondly, this engine—which is as yet a paper proposition—promises an efficient system of internal cooling: a matter which

as regards cool running in his engine by the effect not only of scavenging the cylinder internally with cold air, but further of cooling the piston inside and out, and he considers that, owing to this unique feature, air-cooled engines of very large size could be built for car use on the lines of his invention.

## Piston Rings and—a Challenge.

Mr. Tilston had some remarks on the apparent uselessness of piston rings, and on the valve pistons here described he has abandoned the use of rings. He suggested that some engineer present who had shops at his disposal might experiment with scientifically-constructed engines having no piston rings. He argued that, while rings are indisputably necessary in engines having a bore of, say, 24in. or thereabouts, the loss past the piston is so small during the minute interval of compression of a high-speed small-bore motor cycle engine that it could advantageously be ignored when reliability and simplicity are involved. We would point out, however, that the loss remains proportionately the same, whatever the size of the engine may be, and that in the case of a small bore engine a minute loss is very much more significant than in the case of a large engine. Further, an internal-combustion engine is so much of a compromise that it has been definitely proved that the point of over-scavenging can be very easily reached. This Mr. A.

G. Cocks (Clyno Co.) pointed out; the small amount of burnt gas remaining over from the exhaust period has the effect of warming the fresh charge, thereby preventing instant condensation on the cylinder walls, and, further, it has the effect of deadening the force of the explosion sufficiently to sweeten the running of the engine. We are inclined, therefore, towards the view held by Mr. Cocks that the engine just described may prove in practice to be a trifle over-scavenged, but its cool running is undoubtable.

Naturally, Mr. Tilston's views were contested by prominent trade members present, most of whom,

## THE TILSTON FOUR-STROKE PISTON VALVE ENGINE.

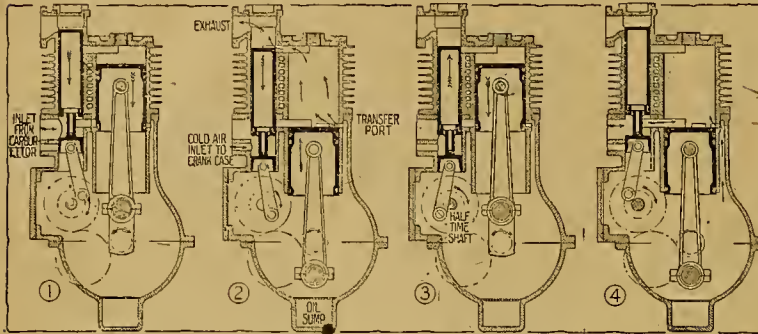


Fig. 1.—Commencement of power stroke; pistons descending; all ports closed.

Fig. 2.—Exhaust stroke; piston valve has uncovered exhaust port; compressed air from crank case being transferred to cylinder.

Fig. 3.—Beginning of vacuum stroke; exhaust port closed; working piston descending.

Fig. 4.—End of vacuum stroke; inrush of gas from carburetter and transfer of compressed air from crank case.

for some little time past has occupied the thoughts of many of our readers. At the bottom of the cylinder there exists a transfer port communicating with the inside of the crank case, as in ordinary two-stroke practice, and pure air compressed in the crank case is used to scavenge the engine during the exhaust stroke.

The piston valve is, of course, driven at half engine speed, and let us now follow the cycles of operation. On induction the piston travels almost to the bottom of the stroke with all valves closed. At this juncture the bottom of the piston valve uncovers the carburetter port, and the gas is drawn at high velocity direct from the carburetter into the cylinder. An interval later the power piston, now nearing the bottom of its stroke, uncovers the transfer port from the crank case, thereby admitting a blast of cold air to the cylinder (this, it seems to us, would cause blow-back from the carburetter, but the inventor claims that the interval during which both ports are open together is only sufficient to relieve the vacuum in the cylinder). Compression and expansion follow in the usual way, but at the bottom of the power stroke not only is the burnt gas allowed to escape into the exhaust by the opening of the exhaust port by the valve piston, but scavenging is further assisted by the inrush of cold air from the crank case *via* the transfer port at the bottom of the power cylinder. This, claims the inventor, displaces the burnt gas which, being equivalent to the unswept area of the combustion head, remains in the cylinder in present-day practice, and he argues further that the negative work done in working poppet valves is greater than the negative work done in working the valve piston, while in his design wear and noise are very much reduced. He also points out the enormous advantage



Mr. Tilston, the patentee, conversing with *The Motor Cycle* representative outside Stonebridge Hotel. The engine, it will be seen, is fitted into the frame of a Baby Triumph.



## Road Demonstration of Tilston Two-stroke.—

however, admitted that they were deeply interested. Mr. Cocks challenged Mr. Tilston to run his machine over a route (to be chosen by Mr. Cocks) in competition with a standard two-stroke conforming with present-day ideas. Mr. Tilston replied that if any manufacturer present would undertake to build his engine at a stated figure he would then be in a better position to consider challenges. He had experimented and built his present model at enormous cost and under great difficulties. It consisted of the remnants of a Baby Triumph adapted in the best way possible under prevailing difficulties. It was not a fair representation of his invention, as he lacked the facilities to build and experiment. The machine that was to be demonstrated was merely a "botched up affair," and therefore those present would realise why he could not accept challenges from manufacturers in a better position than himself as regards the matter of perfecting and developing a given design. For the same

reasons he was unprepared to put forward any information as to the petrol consumption of his engine, but he pointed out that his two-stroke would be less expensive to make than the present-day four-stroke, while his four-stroke would also be less expensive to make than a present-day four-stroke of the same c.c.

Between squalls of rain the demonstration two-stroke machine was ridden by one and then another of those present. Conflicting opinions reached our hearing: many not particularly favourable, though allowance was made for the fact that the engine was a "botched up affair"—as its inventor constantly reminded us—produced under great difficulties. For slow running it certainly compared very favourably with a well-known make of two-stroke which was present, but we prefer to withhold our opinion as to its behaviour on the road. The machine has now been handed over to our staff to undergo a thorough road test extending over two or three weeks, at the end of which time we shall be better able to discuss its capabilities.

## Cancellation of the Petrol Licences.

THE Automobile Association and Motor Union recently protested against the cancellation of petrol licences issued for periods prior to April and May, 1917, and reminded the Petrol Controller that such licences carried an undertaking that they would be valid until all the monthly allowances were drawn.

In reply to the Petrol Controller's statement that the cancellation notice could not be withdrawn or modified owing to the critical petrol situation, the Automobile Association suggested that the notice be strictly confined to those petrol licences held by motorists who relinquished their 1917 Inland Revenue vehicle licences on June 30th.

The following correspondence has ensued:

August 11th, 1917.

The Secretary, The Automobile Association  
and Motor Union, Whitcomb Street, W.C.

Sir,—I am directed by the Petrol Controller to acknowledge the receipt of your letter of August 8th, and to express his regret that, in view of the urgent necessity for limiting the consumption of petrol available for civil needs to the essential trade and industry of the country, he cannot see his way to adopt your suggestion that the recent notice, cancelling out-of-date full duty petrol licences, should be confined to those held by motorists who relinquished their car and motor cycle licences on June 30th last.

(Signed) H. W. COLE.

August 16th, 1917.

H. W. Cole, Esq., Petrol Control Department,  
19, Berkeley Street, W.1.

Sir,—I have to acknowledge receipt of yours of the 11th inst. (reference No. 142,549), and regret that the Petrol Controller is unable to adopt our suggestion that cancellation of out-of-date full duty licences be confined to those held by motorists who relinquished their car and motor cycle licences on June 30th last.

In connection with your notice of cancellation, the Automobile Association is receiving a number of letters from holders of first and second issue petrol licences, who have used their allowances sparingly and solely for business purposes. They have depended upon being able to draw their allowances as and when required, and are now seriously handicapped by the notice of cancellation.

May I, therefore, suggest that the Association be permitted to bring before your Department such cases, in

order that they may be considered on their merits, with a view to the issue of fresh licences?

If you will kindly consent to this being done, I would assure you that no cases will be passed to you unless the Association is fully satisfied that petrol is really essential for business purposes.

STENSON COOKE, Major, Secretary.

August 18th, 1917.

Maj. Stenson Cooke, Secretary, Automobile Association.

Sir,—I have to acknowledge the receipt of your letter of August 16th, in which you call the Petrol Controller's attention to the position of holders of first and second issue full duty motor spirit licences who have used their allowances sparingly and solely for business purposes, and who are now unable to obtain supplies for such purposes owing to the cancellation of all out-of-date licences.

I am to say that the Controller is willing to accept your suggestion that the Automobile Association should be permitted to submit any such cases to him for consideration on their merits, with a view to the issue of fresh licences. No undertaking can be given that new licences will be issued in every case, and only those should be forwarded where there is satisfactory evidence that the petrol is really essential for business purposes.

(Signed) H. W. COLE.

The Secretary, H.M. Treasury, Whitehall, S.W.

Sir,—On behalf of a large number of motorists who are members of this Association, I am directed to place the following facts before you:

Owing to the increasing scarcity of petrol, a clause was inserted in the Finance Act, 1917-18 enabling motorists to obtain a refund of half their motor vehicle taxes paid for this year, on June 30th, upon surrender of their vehicle licences.

Advantage was taken of this concession by many unable to obtain renewals of their petrol licences, but others, who had small supplies in view through unexpired licences, decided not to surrender their licences in the belief that the promise or "undertaking" conveyed on their petrol licences of the first and second issues, that such licences would be valid until they were exhausted, would hold good.

On July 25th a notice was issued by the Petrol Controller cancelling unexpired petrol licences of the first and second issues.

I submit that motorists who have paid Inland Revenue licence fees for this year, and are now without petrol licences, should be entitled to claim a refund of such fees in respect of the period during which they will be unable to use their vehicles. I am, therefore, to express the hope that this very reasonable concession may be granted.

STENSON COOKE, Major, Secretary.



# Current Chat

## TIMES TO LIGHT LAMPS.

Aug. 30th	...	...	8.22 p.m.
Sept. 1st	...	...	8.16 "
" 3rd	...	...	8.11 "
" 5th	...	...	8.8 "

## Quantity Production?

We understand that the price of a pair of handle-bars for a well-known American machine is to-day £4 10s. Is this the result of quantity production?

## High Second-hand Prices in France.

Our French correspondence this week reveals the abnormal prices prevailing for second-hand machines over the Channel. The following instances are given of actual sales: A 1912 Zenith (repainted) 1,800 frs. (£72), a seven months' old Rudge 2,300 frs. (£92), and a T.T. Rudge about two years old 2,400 frs. (£96). One writer mentions that the price asked for a new B.S.A. at Le Havre is 2,780 frs. (£110). If the War Office could dispose of the D.R. scrap heap at prices on this scale the question of war finance would be beyond doubt.

## Some Average Speeds.

A Yorkshire rider asserts that a 30 m.p.h. average is quite easy to maintain on a long trip, and that he has maintained 31 m.p.h. on runs exceeding 200 miles in length. An average speed of 36 m.p.h. or so he considers to be practicable only on two hour runs or thereabouts. We do not think anybody will deny either that 35 m.p.h. is practicable for two hours, or that 30 m.p.h. can be maintained all day. The real point is that either performance is such a weariness to the flesh that very few people would care to put it up.

## The Sale of Second-hand Machines.

A great deal of dissatisfaction would be avoided and trouble saved both to purchaser and vendor of second-hand motor cycles if care were taken to verify the date of manufacture by the engine and frame numbers. Makers are always glad to supply this information. It frequently happens that a vendor, with the best of intentions in the world, sells a machine as, say, a 1916 model. The purchaser does not know differently, buys it as a 1916 model, when he suddenly has a brain wave, discovers the engine number, and communicates with the maker. The maker gives the date as, say, 1915, and there is at once trouble, heart-burning, and ill-feeling. It would not be at all a bad plan if those who have motor cycles for sale were to quote the engine and frame numbers in their advertisements, so that prospective buyers could verify the date of construction.

## The Petrol Position in America.

There seems to be no doubt that the American petrol producers are not having the way made too easy for them, and the result will be an undoubted rise in the price of petrol over there. In the meantime, American motorists are advised not to stop riding, but to avoid waste by rendering their carburetters economical.

## Hercules Reclaim Service.

Mr. F. W. Farr, the patentee of the Hercules Reclaim Service, is now in France, with the object of starting a factory there for undertaking tyre repairs under the French patents. It will be remembered that the special feature of this system is that, although the two covers are sewn together, there are no stitches on the inner surface to ruin the tube.

## Where the Petrol goes.

One of our latest model bomb-carrying planes consumes as much petrol in one hour as would carry a solo mount, say, of the Douglas order, a distance of approximately 2,000 miles—a season's riding for the average man! Those who live in districts where aero engines are made, and hear these mammoths droning away for hours on end under test, realise where some of the petrol goes.

## Overloaded Sidcars.

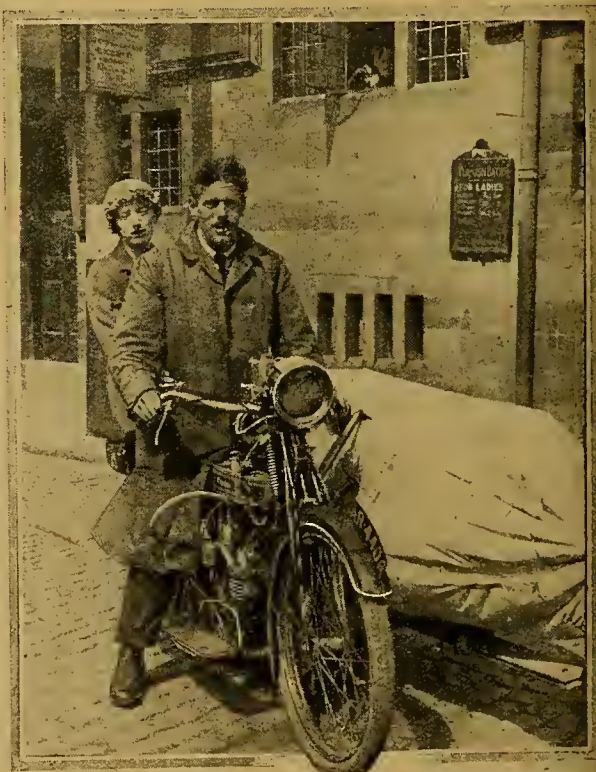
On the occasion of a recent tramway strike in Seattle, when the populace was stranded for means of locomotion, grossly overloaded motor cycles and sidcars came to the rescue. We are informed that none of these seemed any the worse for the ordeal through which it had to go, but no practical rider would countenance such gross misuse as the overloading of his own machine, which is too often practised by the novice.

## SPECIAL FEATURES.

ROAD TEST OF AN OVERSEAS MODEL.  
A POWER UNIT WITHOUT MAGNETO.  
FRAME DESIGN AND THE FLAT TWIN.  
DEMONSTRATION OF A NOVEL  
TWO-STROKE.

## A Malicious Act.

For putting nails and screws on a road over which there is a large amount of motor traffic, two youths, one 18 and the other 14, were fined 45s. each at Grantham last Saturday.



## COAL GAS INSTEAD OF PETROL.

The illustration shows a 2½ h.p. Douglas motor bicycle and sidcar equipped with a gas-bag supplied by Messrs. Andrew Barton Bros., Beeston, Notts. The gas-holder contains twenty-one cubic feet, which is equivalent to rather less than one-fifth of a gallon of petrol; the bag is held in tension from each end, and so arranged that it automatically closes as the gas is used up. It weighs rather under 6 lb., and, when fully inflated, the contents are less than a halfpenny in value. As the machine will travel ten miles at a cost of under a halfpenny the expense of running does not seem to be excessive, though the range of action is naturally distinctly limited. The machine may be seen at Barton Bros.' Nottingham depot.



### The National War Funds.

At the week-end the principal relief funds stood as follow:

The National Relief Fund (distributed £3,641,622) ..	£6,226,436	0	0
The British Red Cross Fund ..	7,233,140	4	8
Tobacco Fund .. .. .	135,875	0	0

### Taking Safety for Granted.

The danger of taking it for granted that the road is open was shown when, last week, a motor cyclist, riding a four-cylinder F.N. and sidecar, crashed into a Ford van, standing at the roadside. This accident occurred on a straight length of the Portsmouth Road between Thames Ditton and Esher. The motor cyclist was looking down at his engine, and, although the road was otherwise clear, ran straight into the van. He was thrown over the handle-bars on to the tailboard of the Ford, but received only slight injuries. The front forks of his machine, however, were driven back on to the steering head, and the front down tube of the frame was split round the whole of its circumference just below the tank.

### The New Order of Knighthood.

Last Saturday the first list of appointments by the King in the new Order of Knighthood, the Order of the British Empire, and a new Order of Companions of Honour was issued. Several prominent gentlemen in the motor world figure in the list: The Hon. Sir Arthur Stanley, M.P., Chairman R.A.C., Chairman British Red Cross Society and the Order of St. John of Jerusalem: Knight Grand Cross. Sir Herbert Austin, managing director of the Austin Motor Co., Ltd., for valuable services in the production of munitions; Sir Dugald Clerk, the well-known gas and internal combustion engine expert, who is a member of the Panel of Board of Invention

and Research, Admiralty, the Ministry of Munitions Inventions Department, and of the Trench Warfare Advisory Panel; and Sir Alfred E. Herbert, Deputy Director-General in charge of the Machine Tool Division, and Chairman of the Machine Tool Committee at the Ministry of Munitions, who before the war was a manufacturer of lathes and machine tools used in automobile construction: Knights-Commanders of the Order. P. L. D. Perry (Ford Cars), Director of Agricultural Machinery Department, Ministry of Munitions; H. Tempest Vane (formerly Napier Motors), service on War Office and Munitions Work: Commanders. G. H. Bailie, Chairman R.A.C. Technical Committee, Chief Technical Advisor, Labour Supply Department, Ministry of Munitions: Member.

### Assault and Battery.

An interesting case came before our notice the other day. A motor cyclist was riding through a London suburb, when some distance in front of him a pedal cyclist fell over. The motor cyclist slowed down, glanced round, and seeing the cyclist pick himself up, rode on. He had not travelled more than about 300 yards before a man walked across the road and signalled him to stop. The motor cyclist continued his journey, blowing his horn, but as he passed the gestulating individual, the latter struck at his head with a thick stick and inflicted a severe wound on the motor cyclist's right temple. The blow was so violent that it cut through a thick cap the motor cyclist was wearing and smashed the stick. The motor cyclist pulled up with great difficulty, as he was nearly stunned, and then questioned the person who had assaulted him, who gave the

amazing explanation that he had acted in this manner because the motor cyclist had knocked over the cyclist and was running away to escape the consequences. Fortunately, the motor cyclist had sufficient presence of mind to give the person who had assaulted him into the custody of a policeman. In due course the case came off and there was no defence, and it was suggested by the Bench that the individual should compensate the motor cyclist. The result was that the matter was settled out of court on the individual paying £10 as compensation to the motor cyclist, the defendant also agreeing to pay all fees and expenses.

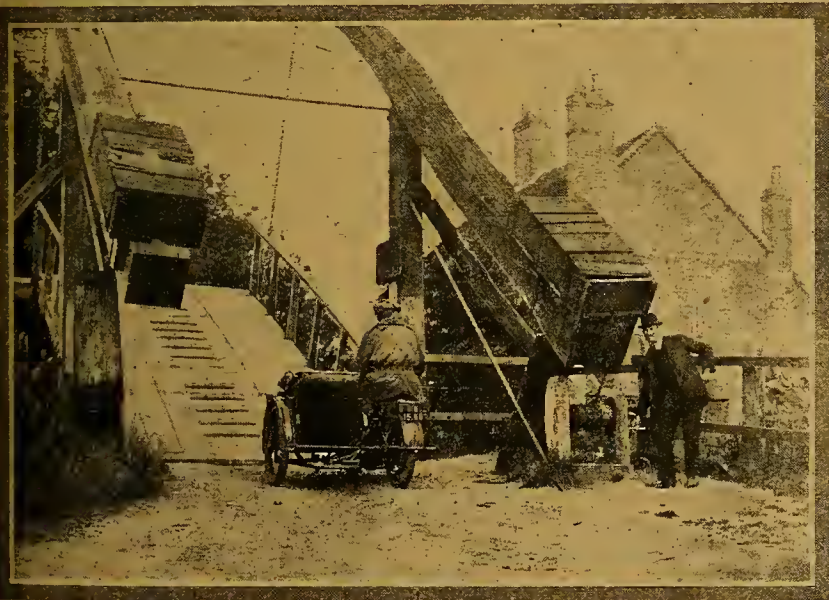
### Average Prices.

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average, or to the lack of other essential particulars.

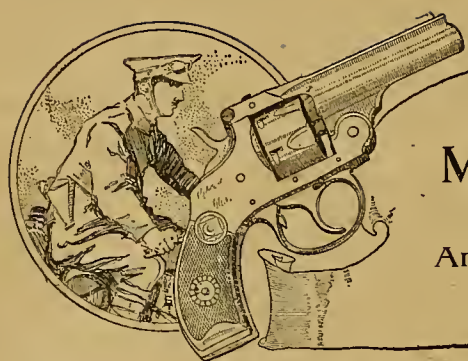
Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3½ 2-speed .....	—	£40
Abingdon ..	1914	5-6 3-sp. sidecar ..	—	£54
A.J.S. ....	1916	6 combination ..	—	£92
" .....	1914	6 combination ..	£71	£66
" .....	1916	4 combination ..	£68	£75
Allon .....	1916	2½ 2-speed .....	—	£32
" .....	1914	2½ 2-speed .....	—	£27
Ariel .....	1915	3½ 3-speed .....	—	£43
" .....	1914	5-6 combination ..	—	£50
Bat .....	1914	6 3-speed .....	£42	£49
Bradbury ..	1914	4 2-sp. sidecar ..	—	£40
Brough .....	1916	3½ 3-speed .....	—	£55
B.S.A. ....	1916	4½ sidecar .....	£57	£68
" .....	1915	4½ sidecar .....	£58	£57
Calthorpe ..	1916	2½ 2-speed .....	—	£30
" .....	1915	2½ 2-speed .....	—	£26
" .....	1916	2½ 2-stroke .....	—	£28
Clyno .....	1915	2½ 2-stroke .....	—	£25
" .....	1914	6 combination ..	£65	£66
Connaught ..	1915	2½ 2-stroke .....	—	£24
Douglas .....	1916	2½ 2-speed .....	£49	£45
" .....	1915	2½ 2-speed .....	£43	£42
" .....	1914	2½ 2-speed .....	£34	£37
Enfield .....	1916	6 combination ..	£84	£82
" .....	1915	6 combination ..	£60	£70
" .....	1916	3 2-speed .....	£45	£47
H.-Davidson ..	1916	7 combination ..	£85	£86
" .....	1915	7 combination ..	£69	£64
Heederson ..	1916	7 combination ..	—	£100
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	5 combination ..	—	£70
" .....	1916	7-9 combination ..	£76	£84
" .....	1915	7-9 combination ..	£65	£64
James .....	1916	4½ combination ..	—	£70
" .....	1916	2-speed, 2-stroke ..	—	£31
Lea-Francis ..	1916	3½ 3-sp. sidecar ..	—	£63
" .....	1915	3½ 3-speed .....	—	£55
Levis .....	1916	2½ Popular .....	£22	£26
" .....	1915	2½ Popular .....	£23	£22
Matchless ..	1915	7 combination ..	£85	£82
New Hudson ..	1916	2-sp., 2-stroke ..	—	£28
" .....	1916	4 combination ..	—	£60
New Imperial ..	1916	2½ 2-speed .....	£33	£32
" .....	1915	2½ 2-speed .....	£25	£27
Norton .....	1916	3½ 2-speed .....	—	£52
" .....	1915	3½ T.T. ....	—	£43
P. & M. ....	1915	3½ combination ..	£75	£65
" .....	1914	3½ 2-speed .....	£45	£50
Premier .....	1915	2½ 3-speed .....	£50	£47
" .....	1914	3½ 3-speed .....	—	£51
Rover .....	1916	3½ 3-speed .....	£68	£51
Royal Ruby ..	1916	2½ 2-stroke .....	—	£24
Rudge .....	1916	3½ Multi .....	£45	£45
" .....	1915	3½ Multi .....	£43	£38
Scott .....	1916	3½ combination ..	—	£60
San .....	1915	2½ 2-speed .....	—	£22
Sunbeam .....	1916	8 combination ..	—	£101
" .....	1916	3½ solo .....	£73	£74
" .....	1915	3½ combination ..	—	£76
Triumph .....	1916	2-sp. 2-stroke ..	—	£38
" .....	1915	4 countershaft ..	—	£55
" .....	1915	2½ 2-sp. 2-stroke ..	—	£27
Velocette .....	1915	2-sp. 2-stroke ..	—	£27
Zenith .....	1915	8 Gradua .....	£60	£60

### AN ANTIQUATED DEVICE.

An ancient drawbridge between Petersbrooke and Earlswood. The projecting beams are weighted with stones enclosed in boxes, the structure being so balanced that an old man can, with the aid of a winch, draw the bridge upwards to allow canal traffic to pass. A Sunbeam sidecar is seen crossing the bridge.







## MOTOR CYCLISTS IN FRANCE.

An Appreciation of the Wonderful Work of Despatch Riders and Orderlies.

By J. FAIRFAX-BLAKEBOROUGH.

IF I were asked what has struck me most of all the strange and exciting, sordid and sad, horrible and horrifying scenes I have seen on the two most active Fronts in France last winter; if I were asked who had gone bravely on with least recognition or hope of glory or limelight . . . I should unhesitatingly answer these two questions with the words—the motor cyclist. Be he despatch rider, orderly, or what-not, the motor cyclist on the Somme and on the Arras side has exhibited a fortitude, a courage, daring and marvellous quickness of action and decision a hundred times a day. The infantry have been simply marvellous—no words would over-estimate their wonderful work or describe all they have gone through. But they have experienced no worse conditions than the motor cyclists, and when they have “gone over the top,” they have done so in concert with the vitalising effect of excitement, a leader—someone to command. There is great sympathy in a crowd, and there is much confidence inspired by a good leader. The motor cyclist stands, or rather works, alone. He is given some point on the map, and, in darkness and storm, it may be, he has to find some person among a thousand. He has no one to accompany him, no one to help him to decide at a crucial moment when courage, rapidity of action, steadiness of nerve, and nice judgment of both space and pace may stand between himself and a buckled wheel or broken leg.

### Wriggling through Traffic.

I have watched by night and day and early morning these motor cyclists—covered with mud and snow and water—worming their way through every form of traffic, carefully, quickly, and successfully, with admiration and amazement, and I have more than once said to brother cavalry officers with me, “If those men could only ride a horse as well as they ride a motor cycle what wonderful jockeys they would make.” One has so often seen races lost simply because a jockey has not had the pluck or the quickness of action to force his way through an opening between other horses. So has one seen races won by jockeys seizing an opportunity of breaking through a momentary gap and coming in and winning. There is all the difference in the world between the average gentleman-amateur rider and the professional jockey in this respect. The one is lost in a crowd: the professional can judge pace and make the most of opportunities to “get on.” That is exactly what the motor cyclist out here does. He is an opportunist with nerves of iron, a clear head and eye, and a knowledge of space and pace—he sees a gap and can judge whether he can be through it before it closes.

Sometimes I have seen cyclist orderlies squeeze through with a floundering motor tractor on one side of the road and a team of nervous, shying mules on the other. I have simply held my breath, and expected to see a mangled mass of crushed flesh and blood the result, but before I have recovered he has been on his way with his message to “corps” or “brigade,” to “Q.” or some general. I have seen them riding between two columns of traffic—both miles long, travelling in opposite directions, on narrow roads, a bog everywhere and punctuated with shell holes. I have watched them wriggle through, pass restive or exhausted and fallen horses, and great heaving, rolling motor lorries, and wondered. I have watched them when hail was driving in their faces and they could hardly look up, when they have had to ride in a gutter almost knee deep in mud for two or three hundred yards, and I have thought, “My God! You are amongst the heroes of the war. . . . You are brave men indeed!” . . . For, mark you, I have painted my word-picture badly if I have not conveyed to the reader the dangers, the difficulties, and hardships of the road both day and night prior to the fine weather which came with May. I have not dwelt upon the indescribable conditions of the roads, in which when a horse falls he sometimes sinks and is lost, and on the top of some parts of which sleepers, put down to try and make a surface, float instead. I have not touched upon the shelling of roads at night, the blockades for hours and hours, and all the incidental dangers and difficulties, but they all have to be overcome by these courageous “pilgrims of the night.”

### The Search for Objectives.

When we have been moving almost daily I have known them come from H.Q. (Headquarters) in the most violent storms, at two, three, and four in the morning, sometimes with only a vague map reference to go by, “You’ll find them somewhere about there.” “Somewhere about there” might mean we were on a bog with half-a-dozen other units (none of them quite clear who their neighbours are), camped half a mile from the high road, with a knee deep in mud approach from that road. Imagine this in storm and darkness, the search for the particular commanding officer or adjutant required, the vague directions and definite misdirections, the return to H.Q. in more storm (and every day of February, March, and April seems to have brought its storm), only to find fresh orders—possibly cancelling the first—to be taken to the same place. And there are those at home who have imagined, and *do* imagine, that riding a motor



**Motor Cyclists in France.—**

cycle in France is what is known amongst soldiers as "a cushy job"!

**They Enjoy their Jobs!**

I once asked one of these despatch riders how many of them were attached to his particular H.Q., and he told me two, so that when possible they alternated with night and day duty. Of course, some H.Q.'s have a perfect army of motor cyclist orderlies who keep generals and staff and subordinate commanders in constant touch, especially on the move, when, of course, no telephonic communication can be established. I have come across some of these brave lads who are public school boys, and who love the excitement of their job, but this fact (I mean the fact that they get pleasure out of their job) makes them none the less heroes. They have done excellent work under conditions which could not well have been worse for man and machine, and when the story of the war comes to be written they will deserve a chapter printed in heavy type and red ink, for they have come

in for little honour and glory during these three years of hardship—mud, filth, and squalor, to say nothing of danger. What Henri Barbusse says in "La Feu," written last year, applies most eloquently to the motor cyclist heroes of whom I write, especially when he speaks of the endurance; of the mud that

"glues the *poilu* to the earth"; of the cold that freezes him into a statue; of the vermin that rob him of sleep when he does find opportunity to lay him down; and of rain and snow and mud soaked through his clothes—these three the very hell of war—which chill him to the marrow. Yet our English boys—and they are often little more than boys—with cold-skin - peeled faces and frost-bitten ears, have still kept on smiling on their mud-coated motor cycles.



Besides merely being clever riders, D.R.'s have necessarily to be clever mechanics, and able to undertake other than those which are designated "roadside" repairs. In the hotel yard, which these incorrigible humorists have designated "Hotel Clutch and Gear Box," despatch riders are seen adjusting the clutch springs of a W.D. Triumph.

Yes! it gives me real pleasure to pay this tribute of honest admiration for them, as I trust it will be paid in the history of the war.

Fortunately, now the weather has changed, and we are living in scorching heat and clouds of dust. The motor cyclist, in consequence, now leads a life of comparative pleasure to that of a few months ago.

## Keep up the Revs. A Few Driving Hints.

IT is very often that the ultra careful rider, who is desirous of saving his machine and economising in every way possible, drives atrociously badly, and, if he knew it, goes entirely the wrong way from achieving the results he so much desires.

The man who is frightened of opening his throttle does not save petrol, and generally he abuses his engine. If he took for his motto the phrase, "Keep up the revs.," he would do much better in every way. Particularly does this apply in the case of a single-cylinder machine with sidecar attached.

Most careful riders hate to hear their engines turning over at anything approaching high speed. They approach a hill in a leisurely manner, allow the engine to konk along at slow speed, postponing the change down till the last moment, and even in low gear they keep the speed of the engine down so that the force of each explosion can be felt.

This is entirely the wrong way of going about it, and while it does an engine no harm whatever to turn over at high speed, this overloading at low speed is apt to do very considerable harm. Let us imagine what it means. Every stroke of the engine delivers—a jar throughout its bearings and throughout the transmission system, whereas, if the speed of the engine be kept up, the torque is more or less even. Moreover, when an engine is running slowly on heavy load the hot, slow explosion causes pitting of the valves, high oil and petrol consumption.

"It is the hammer-hammer-hammer" that does the harm. In hill-climbing, approach the hill at a goodly speed, and change early, allowing the engine to keep up a lively purr throughout the climb. In changing down do not close the throttle, but allow the engine to pick up during the fraction of a second that the gear is in free.

B.



# FRAME DESIGN AND THE FLAT TWIN.

## Dealing with a Common Weakness in Present-day Design.

ONE of the most frequently heard criticisms of all those that are levelled against the flat twin is the complaint that it is a most ungrateful unit to deal with when designing a frame for its reception, and certainly the more one has to do with it the more one realises that this, indeed, is the most powerful obstacle in its progress and development.

It often happens that the infusion of "new blood" into a movement results in very rapid and noticeable improvements, but despite the fact that the firms who have taken up the production of flat twins are mostly "newcomers"—that is to say, they did not graduate through the push cycle and early motor cycle periods—they have shown a disappointing lack of feeling for correctness of frame design.

Naturally, the engine being the all engrossing interest of the designer, it is not difficult to understand that the laying aside of an attractive unit until the problems of housing it had been thoroughly overcome would be too great a sacrifice, and in consequence frames have been manufactured which can lay no claim to scientific principles, and may be regarded merely as makeshifts which hold together, more or less successfully, by virtue of the weight of metal in the vital parts.

### A Universal Weakness.

The weakest element in the motor cycle frame (irrespective of type) is the front down tube, and to make any departure from the straight line here is fatal, therefore to dodge that obtrusive front cylinder a duplex front construction appears inevitable. (On the score of increased lateral stability I think this a desirable feature in *any* frame.)

It is tolerably easy to sketch out an elevation of a frame to contain a moderate-sized flat twin and countershaft gear box, embodying the above principle and maintaining a pleasing appearance, but having established this general outline let anyone sufficiently interested now attempt to draw a plan view of the engine and transmission showing the frame tubes in a section taken just below the tank.

Allowing the same freedom in the disposition of such engine parts as the exhaust and inlet systems, transmission and fittings, as would be allowed to the designer of the complete machine, it will nevertheless be observed that there are many difficulties in the way of completing a compact frame preserving the straight tube ideal.

That other people have been over the ground before and have wrestled with its difficulties I may illustrate by recalling the experience of a certain firm which obtained a flat twin engine of considerable size and power. The "heads" insisted upon the use of duplex, straight tube principles, and a very sound but abnormally heavy and clumsy frame was evolved.

The satisfaction of the designer was rudely dashed when he discovered that the united efforts of two mechanics for several hours were necessary before the engine could be induced to fall into position!

### Advantages of the Duplex Frame.

It is supposed in the suggested sketch elevation that the whole frame is duplex with the possible exception of the sloping top tube, and that the horizontal members supporting the engine and gear box are either light channels or stout plates to the extremities of which the various frame tubes are secured by means of long bolts and distance pieces.

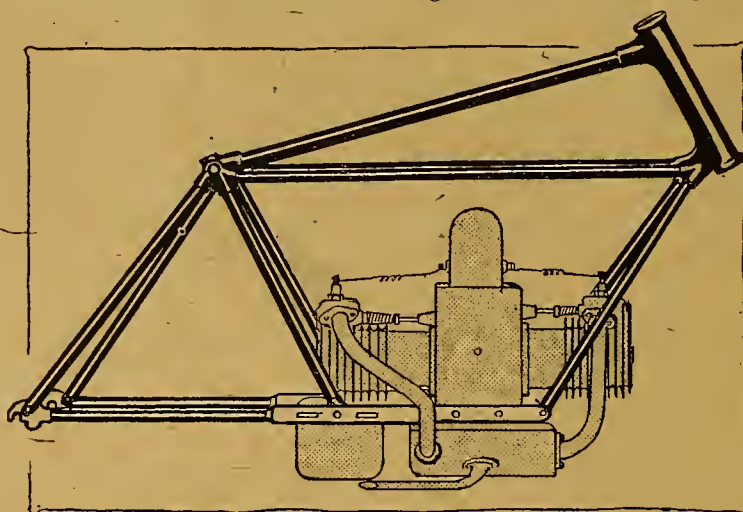
Whilst not being absolutely complete in detail the design indicates the pleasing appearance given by the application of straight tubes, and also that no startling departures from "standard" outlines should be necessitated; it also embodies a long steering head, a desirable feature too often ignored in the effort to preserve the horizontal top

tube. The most objectionable feature is that the countershaft centre falls so far outside the engine and hub centre line (here again we are up against another of those attendant difficulties seemingly inseparable from the type), but granting sufficient stiffness in the lower compression members of the frame the effect of the stresses set up by the drive would be negligible.

There has been much beating of the wind by learned gentlemen who are capable of "proving" that the flat twin is streets ahead of its competitors in the matter of mechanical perfection, but perfection lies in all-round perfection. An engine, however excellent, is conceivably a cause of trouble if its design be such as to render impossible a good type of frame.

In short, an insistent demand must be raised to the manufacturers that they pay more attention to the elementary principles of design as applied to flat twin construction, for as long as bent tubes (especially of D sections) are employed so long will the idea live that the flat twin cannot be built into a decent frame.

WHARFEDALE.



The author's design, in which he claims to have eliminated certain common weaknesses in flat twin frame design.



## MILITARY NOTES.

## Types of D.R.'s. Revision of Medical Categories.

## A YOUNG D.R.

LETTERS and photographs continue to reach us respecting young D.R.'s. Mr. F. J. Raymond, speaking of his son, says:

"With reference to the letters appearing in your useful paper regarding young despatch riders, I should like to mention that my son, Cpl. F. Raymond, joined in August, 1914, at the age of 15 years and 9 months, and sailed for India in that year as a D.R., and after serving there for some time volunteered for Mesopotamia, and is acting as a despatch rider attached to the H.Q. Section Army Signallers. As we send him

every week, the letters should be interesting reading for him."

## TWO CLASSES ONLY FOR ARMY.

A FURTHER revision of the medical categories for recruits may be expected shortly, says *The Times*. The details have not yet been worked out, but it is understood that men fit for military service will be classified under two heads only—those fit for service in the field, and those who, without any organic disease, are unfit for active campaigning. These may be classified as Classes 1 and 2 of only one category, probably A. The second category may consist of men who, unfit for any form of military service, could still do war work in connection with national service at home.

## TYPES OF D.R.'s.

A DESPATCH rider on active service speaks of a "type" of D.R. which the contributor of "D.R.'s and Their Work" did not mention: "As an interested reader of your paper, and also as a D.R. 'out here,' I should be pleased if you will allow me to make a few remarks on your articles, 'Who is the youngest D.R.?' appearing in your issues of July 19th and 26th. Probably nobody has taken the trouble to reply to Mr. Roughley's statement (or query), but the morning I received your paper I questioned one youthful-looking chap on the subject, who said he enlisted with a friend when their ages were 17 years 2 months and 17 years 4 months respectively. This D.R. has been on active service nine months with a Divisional Signal Company, and was prevented coming 'out' before on account of his youth. I and nine others have served twenty-eight and a half months with the same Signal Company, and came 'out' on November 7th, 1915—twenty-one months, and still going strong, even though 'fed up.' Your article 'D.R.'s

and Their Work' has prompted me to write, as your contributor does not mention in his 'Types of D.R.'s' (one who is detested by most D.R.'s) the 'Swank.'"

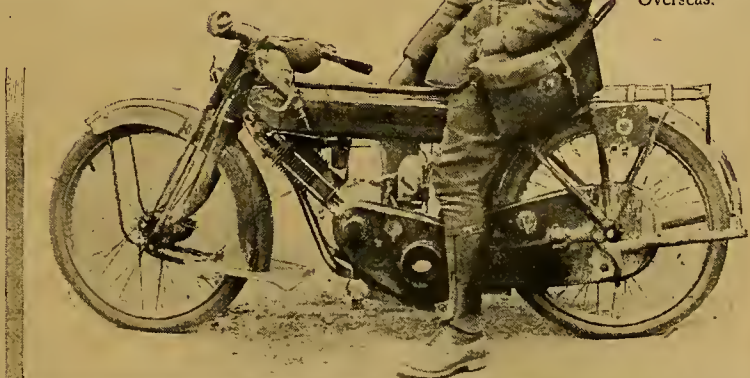
## ONE OF THE FIRST WITH THE TANKS.

FRED BARNES, a Coventry Rudge enthusiast, writes from St. John's Hospital, Canterbury: "I noticed a photograph of Gnr. Jakins, one of my old



Fred Barnes, well-known in the Midlands as a Rudge exponent. He was wounded by shrapnel at Messines.

chums of the Tanks. I am enclosing a photograph of myself and Triumph, taken while in France as a D.R. for the Tanks. Unfortunately, I was wounded at Messines on June 7th, 1917, with shrapnel bullet in my left foot, but I am now on the high way to recovery. Previous to being in the Tanks I was with the Motor Machine Gun Corps training at Bisley, which was one of the first to be formed into Tanks."



C. G. Probert, who is nineteen years old, and has seen eleven months' service Overseas.

## MOTOR MECHANIC AT 17½ YEARS.

"H A V I N G read the interesting letter from your Rochdale reader, who wished to know who is the youngest motor cyclist despatch rider to go on foreign service, I would like to raise the question: 'Who is the youngest motor mechanic to go on active service?' as my son, H. T. J. Jacobs, at the age of 16½ years joined the United Art Forces as a despatch rider. After serving for six months he joined the Motor Machine Gun Corps, attached A.C.S. (M.T.), as a mechanic, and then transferred to the 1st Armoured Motor Battery, and at the age of 17½ years went on active service as a mechanic to British East Africa, and has been serving abroad for the last eighteen months.—S. JACOBS."



Cpl. H. T. J. Jacobs.

## ANOTHER YOUNG D.R.

E. C. DAVIS, writing from "somewhere in France," says: "I have noticed in 'Military Notes' in the 'Blue 'Un' for two consecutive weeks a paragraph on who is the youngest D.R. I enclose a photograph of a friend of mine in our company, who is not younger but equals the claim of young Roughley. My friend, C. G. Probert, is called the 'Baby of the Company.' I trust you will give this the same publicity as in the case of young Roughley, and wish *The Motor Cycle* every success. I can assure you it is eagerly sought for by all the boys."



# THE Critic



## Fireside Chats on Motor Cycle Problems

### BRAKES.

THE D.R. had been laying down the law with regard to front wheel brakes. "As it stands to-day," he said, "it is merely an inflection, existing to comply with the law. It is of no use; it is a possible source of danger, as witness the case of a rider in Scotland who was killed a year or so ago by the brake block twisting round and jamming the spokes. The law demands two brakes, so let us have two of the sensible variety contained in the rear wheel."

"I disagree with you entirely," stated the Manufacturer.

"So do I," chipped in the Journalist.

The D.R. looked surprised. "What in the name of fortune is the good of a front wheel brake?" he demanded. "You seldom use it. If you do you are likely to come a cropper. Its only use is that it complies with the law, and the in-operative variety is probably the safest."

"You always ride solo," the Journalist pointed out. "In which case a front wheel brake is certainly not of much use; but in the case of a sidecar machine, it is not only desirable, but necessary. If once your rear wheel starts to skid, you are done."

"What's the matter with the Indian as a sidecar machine?" snorted the Discharged Soldier.

"Only one thing," the Journalist enlightened him. "It is short of a front wheel brake."

#### Why Two Brakes?

"I might ask you," put in the Manufacturer—"What's the use of having two powerful brakes on the rear wheel, when either one of them is sufficient to skid the wheel? Now listen. A leading Coventry firm recently experimented with the two rear wheel brakes—internal expanding and external contracting. When this firm's design was carried into practice, not only was it found wanting in other respects, but the rear wheel actually weighed more than the three-speed hub gear originally fitted!"

"Clumsy design," growled the D.R. "Two rear wheel brakes need weigh only a few ounces more than one."

"But why have two of them, when one will do all that can be done in the way of stopping the wheel?" queried the Journalist. "The idea is absurd on the face of things. You must admit that the second brake, demanded by law, can be put to some useful purpose. The maximum braking effect is when the wheel is nearly, but not quite, skidding. Immediately it begins to skid the power is lost. Now by braking both wheels—the back wheel to the maximum point—the retarding effect is obviously much greater than if only one wheel be braked."

B16

"As a matter of fact," put in the Manufacturer, "the front wheel is, theoretically, the correct place for a brake, because, when the impetus of the machine is being rapidly checked, all the weight is thrown on the front wheel, and consequently, in the case of a sidecar outfit, it is probably the better wheel of the two to depend upon."

#### An Abomination.

The Novice observed that the D.R. was getting rather more than he asked for, at which the latter observed, "Don't be a blithering ass. Lend me a match." After he had lit his pipe, he proceeded: "I admit that there may be something in what you say for sidecar machines. I have never ridden them in competition over mountainous routes, but I know that if the rear wheel begins to skid on a bad descent it is the very dickens. In such a case a good front wheel brake might save disaster, but all that does not alter the fact that the front wheel brake as it stands to-day is an abomination of desolation."

"If you fit good leather blocks instead of fibre blocks it grips a hundred times better," mildly put in the Novice.

"I don't care a straw," stormed the D.R., "the whole principle of a rim brake—operating on a plated rim above all things!—is a relic of an undesirable push-cycle practice."

The Manufacturer sat up and snorted loudly. The Novice, feeling nervous, brushed his waistcoat. The Journalist puffed hard at a cigar given him that day by the patentee of a novel two-stroke.

"We have others," presently observed the last named gentleman. "What about the Lea-Francis and the Allon?"

"The exception proves the rule," admitted the incapacitated soldier. "And anyway two mushrooms don't make a boiling. For those two I can mention practically every other leading make in the kingdom who fit the old rim variety."

A long silence followed. "It comes to this," the Journalist finally summed up, "that the present day front wheel rim brake is a farce. We want something better. If we are to have two brakes, we may, at least, have two which will work. On that we are all agreed. Now what about rear wheel brakes?"

"Hullo! he's after copy," observed the Novice rudely.

"I don't wonder," laughed the D.R. "If many more of our debates are going to be taken against us, we shall have to appeal to the trenches for reserve subjects. Anyway, what about rear wheel brakes?"

"I do not think the subject permits of much argument," said the Manufacturer. "I think it is finally decided that the internal expanding metal-to-metal variety is to supersede all others."

"Not a bit of it!" stated the D.R., peremptorily, prepared, after his recent dressing down, to contradict everything the Manufacturer said, even at the cost of contradicting himself. "It may be all right for your touring limousine family tramcar outfit, but the solo rider doesn't want it. Give me the simple tension rod and leather shoe on the brake rim. It scores on the points of cheapness, lightness, accessibility, simplicity, and visibility."

"And if you get a little grease on your rim it is still visible and simple, but it is no longer a brake," sniffed the Journalist.

#### Personal Opinions.

"And if you get a chunk of fluff in your jet it is still a jet, though it no longer functions as such," snorted the D.R. "Simplicity, cheapness, and lightness score. I have no quarrel with the old brake shoe variety. For the T.T. solo mount it cannot be beaten."

"O my stars!" gasped the Manufacturer. "This selfish blighter is obsessed with solo mounts! For goodness sake widen your ideas, man!"

The Journalist, feeling his responsibility as host, took command, while the D.R. stared vindictively at the Manufacturer. "I have recently been riding as solo mounts a Velocette and an A.J.S.," the Journalist explained. "On both these machines the metal-to-metal brakes were superb. As for the weight question, I never noticed it."

"Not likely to," sneered the D.R., "considering you never tried either machine minus its heavy rear wheel mechanism. In the case of a lightweight particularly, there should be as little weight as possible in the rear wheel."

The Manufacturer regarded him narrowly. "Which weighs the more," he queried, "the expanding brake, which uses the sprocket as a drum, or your precious shoe brake, with its special belt drum on which to operate?"

But the D.R. was losing interest in things. It was one of his off nights. He observed, by way of a soliloquy, that he thought the Manufacturer drank too much, while the shape of his nose was disgusting. As for the Novice, he was getting horribly fat—a most loathsome exhibition. "Give me the Indian," he added, "minus a front wheel brake, and with its internal expanding—No what in thunder do I wait?"

But no one attempted to answer.



# LETTERS to the EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

## PETROIL LUBRICATION.

Sir,—We feel it necessary to contest a statement in an article appearing in last week's issue of *The Motor Cycle*. It is surely erroneous to state that the petrol system "has been acknowledged to be the most satisfactory method of lubrication for a two-stroke." We think that if you had written "unsatisfactory" you would be much nearer the mark. We should like to know who has "acknowledged" this system to be superior. We think it to be far more generally acknowledged that the petrol system has two advantages only, viz., it is automatic (in a crude fashion) and foolproof, subject, of course, to the proviso that if the rider is fool enough he might forget to put the oil in at all, which is not unknown. The disadvantages of this system are almost too well known to need recapitulation, but, having stated its advantages, it is only fair to state the other side. The great failing with the petrol system is its inefficiency and its incapability of adequately lubricating the main bushes. The abnormal wear of main bushes lubricated on this system as compared with the Levis system is very noticeable, and we contend that our bushes will last three times as long as those lubricated with petrol. Its other general disadvantages are that it is frightfully messy, it tends to gum up the piston rings, and, unless an excess of oil be given for all other times, it does not adequately lubricate the engine when ascending a stiff hill.

We think no more significant admission has been made than the statement made by Mr. Archie Cocks, of the Connaught and Clyno fame. Mr. Cocks, in the course of his short speech at the demonstration of the Tilston engine at Stonebridge on Wednesday, August 22nd, laid claim to being the first exponent of the petrol system of lubrication in this country, and confessed that, while the petrol system was quite efficient for pottering about, he had found it "quite unsuitable" for long journeys or a hard day's run at 20 m.p.h. average.

We think that this statement made in public, coming from Mr. Cocks, who has so long been connected with and who boosted the petrol system, is sufficient "acknowledgment" of its being unsatisfactory. BUTTERFIELDS, LTD.

## THE CRITICS.

Sir,—If I had to serve with "Howitzer R.G.A.," whose letter appeared in your issue of August 16th, I should keep an eye on him, lest he shot me in the back. He seems anxious to treat the British motor cycle manufacturer in that way. He admits that ten years ago the British manufacturer had an absolute lead; he had, but he did not start with it, and, if the plain truth be told, the British manufacturer held that lead right up to the beginning of the war. Proofs—he held the home market and could not turn out enough machines for it; he had captured, without trying very hard for it, the bulk of the Colonial and foreign trade, and was only kept out of America by a tariff wall, though there was no tariff wall to keep Americans out of Great Britain. Did the American wipe the floor with the British manufacturer in the T.T. races? Does he do it in the Colonies? All of which is not bad for "half educated, pig-headed, purblind tinkers."

His cheap sneers at the pitiful two-stroke can be allowed to pass, but can he produce a two-stroke built in America (which is the home of this type of engine) which can surpass the performances of, say, the Levis? Do the American two-strokes, introduced as a "feeble and remote copy" of British machines, excel them in any particular relating to engine efficiency, cleanness, and general suitability for the purpose for which they are offered? I say they do not.

If "Howitzer" will acquaint himself with American designs he will find that there are copies of the Triumph two-stroke which as copies are neither feeble nor remote, but full-blooded and slavish as copies. The pile of wires, etc., etc., may be awful when of British origin, but the American sidcar combination is—more awful! (I nearly lapsed into military terms.)

The properly trained motor cycle engineer is all right, but there is not enough of him to go round—even in America. I question whether he is born yet. But the p.t. engineer is sometimes a trifle *difficile* in a motor cycle factory. Engineers did not originate the bicycle, and the best features of motor cycles have usually been introduced in spite of the trained engineers—who are, however, excellent fellows.

Is it not surprising that for years prior to the war the prices of the British motor cycles steadily went up, and the highest priced machines were always the hardest to get? Will "Howitzer" ponder that; also that the double purpose idea is not the manufacturers', but the users'.

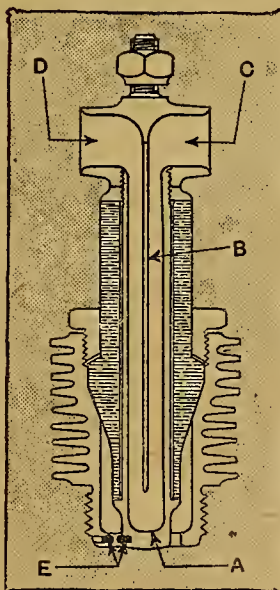
I believe it is possible to discuss and compare British and American machines without desiguedly disparaging either, but, when comparing their performances, do not let us forget that a motor cycle can usually make a show of some kind if the engine is big enough for a car.

"Howitzer" is "fed up" with writing; I know—and I have reason to know—many riders, manufacturers, and others are fed up with reading stuff that has only one object, to decry British machines and laud up the Americans.

In conclusion, see what the British manufacturer will have to offer after the war.

EX-SERGEANT, M.M.G.

## COOLING THE ELECTRODE.



The air-cooled sparking plug with ventilating funnels referred to in G. Funck's letter.

Sir,—*Apròpos* the sparking plug design suggested by your correspondent, Mr. Geo. J. Hide, in your issue of August 16th, in which the hollow central electrode is cooled by means of an induced current of air, I think that the plug designed by myself, and patented by Mr. G. St. B. S. Watkins, would be of interest to your readers.

It will be seen from the accompanying illustration that this design is very similar to the one suggested by Mr. Hide. It was fully described in *The Autocar* of September 9th, 1916, and also in *The Light Car* at about the same time. The cooling draught which circulates through the electrode can be forced by means of a simple cowl or by connecting the electrode to the induction pipe, in which case it could act as an auxiliary air supply, feeding hot air to the engine. I have worked out a variety of designs, but the plug shown is probably most applicable to a motor cycle engine.

—GEORGES FUNCK.



## WHICH TYPE OF ENGINE?

Sir,—Considerable discussion is still taking place I notice as to the type of engine which will be most popular after the war, especially for the passenger type of machine. I quite agree with "Ixion" that the V twin is an abomination—for its weight, for instance, as well as for the reasons he states in the issue of *The Motor Cycle* for August 16th. He suggests the four-cylinder as its successor, but why is it that every writer on this subject deals with the present type of engine, and never suggests that great and extraordinary developments may take place, and an entirely new type of engine be produced?

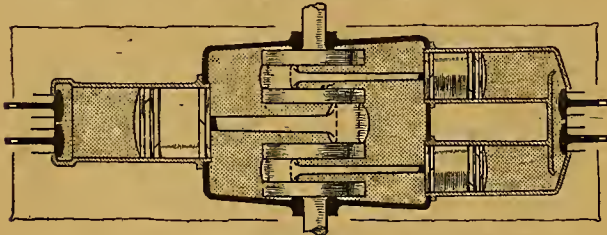
By a new type, I mean one new to the public, for the files at the Patent Office reveal very numerous attempts to solve the problem, and by what I have recently seen I am convinced that the problem has been solved, and that we shall soon have a 10 h.p. engine weighing about 30 lb., with no cranks, connecting rods, or reciprocating pistons, giving two power strokes per revolution, with two sparking plugs—a natty little engine contained in a case about 9in. x 4in. Look out for something thrilling from America in this line, unless our British manufacturers buck up and get in first.

QUI VIVE.

## FLAT TWINS.

Sir,—In glancing through *The Motor Cycle* of August 2nd I notice that those "terrible twins" are on the carpet again, viz., "Ixion" and a critic—"Wharfedale," page 116.

These are strenuous times, and particularly so to the engineer who is trying to "carry on" with the aid of a "diluted squad," hence when "Wharfedale" refers me back to page 66 I accept his statement unquestioned and save time, but I enclose herewith particulars of an arrangement which may help to dispel some of the gloom surrounding the points (3 and 4) which he raises regarding "the unbalanced couple in existing flat-twin engines."



The Alder horizontally-opposed engine (patent 12,314, May, 1914), designed to eliminate the couple inherent to engines of the flat twin type. Theoretically the balance of this engine is perfect, but the design is reminiscent of an experimental Humber model. (See accompanying letter.)

In this engine the cubical capacity of the two small cylinders is exactly equivalent to that of the opposing large cylinder, and, of course, the cranks and pistons of the two small cylinders are equal in weight to those of the large cylinder. There is no increase in complications, for the two small cylinders having a common combustion head, only one exhaust valve and one inlet valve are necessary. I have designed a two-stroke marine engine on the same lines.

The advantages of this system of engine construction are: (1.) All moving parts are in perfect balance. (2.) The shock due to explosive force is completely abolished within the engine. (3.) Friction on crank case bearings is reduced to a minimum. The patent covering this engine is dated May, 1914. Certain events happening in August of that same year must have put "the tin hat" on many similar propositions.

STANLEY ALDER.

## INVERTED CONTROL LEVERS.

Sir,—I note in your issue of August 16th a letter from Capt. Lindsay re handle-bar levers.

I got so fed-up with the standard pattern clutch lever on my Norton that I put the control on to the inverted lever some six months ago with an ordinary Bowden lever which I had by me for the exhaust lift, which is comparatively little used.

This is a great improvement, and I shall certainly stick to it in future.

I must say I cannot follow Capt. Lindsay's argument about the anatomy of the hand and the various types of lever.

B20

Granted that the strength—and, I think, the sensitiveness—of the hand resides chiefly in the first two fingers, it seems to me that the greatest power and accuracy of control will be obtained by these fingers working at the greatest possible distance from the fulcrum of the lever, i.e., with the inverted type lever, and I certainly find this to be the case in practice.

However, I suppose it is like the question of which way a carburetter lever should open, all a matter of habit and taste, and it is not much good arguing about it. I believe there are even some queer people who actually prefer the American twist grip control to any other!

With regard to the general question of internal v. external Bowden wires, my fourteen years' riding experience leads me to consider them both equally reliable, though I have always had a preference for the internal form as being neater and less liable to damage in case of a spill.

I have never had any difficulty in renewing an inner wire, the method being: (1) grease the wire, (2) thread it through towards the handle-bar, (3) sweat on the nipple at the handle-bar end, and (4) adjust the length and sweat up the nipple at the far end.

W. WM. EVANS.

## DIVIDED SKIRT.

Sir,—Could any of your lady correspondents inform me where I could obtain the pattern for making a motor cycling divided skirt, as I desire to make it myself rather than purchase it ready made?

(Mrs.) A. M. BUNCE.

## POLICE INTERFERENCE.

Sir,—With reference to "H. Aldred's" complaint in your issue of August 9th that he was stopped and threatened by the police of St. Helens, may I ask him if any action has been taken by them? I have saved my petrol and am contemplating a tour in North Wales, and I am trying to find out the possibilities of any interference.

ALFRED E. SKINNER.

## FORK STEMS.

Sir,—I first began to read your journal in the days when you printed the "Let us s'pray" advertisements of the well-known French carburetter, and my passenger carrier was a trailer, so I think I must claim to be an "old" rider in one sense at least.

I have derived benefit from many of your readers' experiences, as described in *The Motor Cycle*, and that is my excuse for describing a mishap which occurred to me recently whilst going from Sheffield to Matlock, as I hope I may prevent some motor cyclist from having the same sort of spill.

My outfit is a 1913 Chater-Lea-Jap, which I got cheaply and have overhauled, and, with my wife in the sidecar, all had gone well until we got halfway through Chatsworth Park. Here I noticed the steering become "queer," the front wheel having a curious tendency to run us off the road. I dismounted, and found the wheels were not tracking properly, but could find no proper cause for this. When we got about a mile through the park, however, the trouble was explained very forcibly by the crank case ploughing up the road for a few yards, while the passenger and I nearly "unloaded." When I got free (my ankle having become jammed between the sidecar spring and the chassis), I found the fork stem had broken off at the crown, and, to cut a long story short, we had to leave the combination at a farm near by, where it remains up to the present awaiting new forks.

Now, Mr. Editor, my reason for inflicting this yarn on your readers is this. I wish to warn them, in case of a sudden defect in the steering of a machine, not to go on and trust to it "coming all right." My folly in doing this might easily have caused serious injury to myself and my passenger, but for the fact that I was going comparatively slowly at the time of the smash. Another point I wish to make is this. In spite of the numerous breakages of fork stems and steering columns (attended in most cases by serious results), very little improvement has been made in this most vital part of the motor cycle frame. Is there any reason why the steering column and fork stem should remain of such small diameter? This is almost the only member of the "frame" consisting of a single tube, and, to my mind, the fork stem should be at least 1½in. or even 2in. in diameter for a heavy machine.

I hope my letter may be the means of directing the attention of makers to this neglected part.

W. H. BERESFORD.



## THE OILING OF HORIZONTAL TWINS.

Sir,—I notice that most horizontal twin motor cycle engines are still oiled by the splash system. Surely motor manufacturers might find a better method of oiling than this, now that the horizontal twin engine has been on the market for several years. It would not require a great inventive genius to do this, as gas engine makers have several methods in use with stationary engines, and run their oil pipes to the surfaces that require lubricating. I believe that different oils are used for different parts of a gas engine—thick oil being used for the cylinder, and thin oil for the crankshaft and big end bearings, and I cannot see why this should not be done on a horizontal motor of a motor cycle. A pump might also be fitted to draw the surplus oil from the crank case and return it to the oil tank, or even to another tank, and this oil could be used again after being cleansed at home. I am sorry I cannot experiment on these ideas, but I am too busy at present acting as a running target for the genus Hun.

B.E.F.

## MUD PLUGGER.

## SPARKING PLUG DESIGN.

Sir,—I have read with great interest some recent discussions on the behaviour of plugs of various makes in various engines. I would like to state my experience of plugs in a certain high-speed  $2\frac{1}{2}$  h.p. flat twin during 1913-14. This engine, after much experiment and tuning (?), would run up to 4,650 r.p.m. under advantageous conditions on the road, and maintain that speed—traffic and roads allowing—for hours at a time; but only when I had found the plugs which would stand up to it. I think I tried every well-known make of plug, including two advertised as "racing plugs"—the less said about these the better—and they all had a fair trial. There were single, two, three, four, and "umteen" point plugs, and only two makes gave anything like satisfaction; and eventually I came back to the make, though not the pattern, supplied with the machine, being, as some of your readers will have guessed, of Germhuh manufacture! Of the plugs mentioned above, many were good enough for ordinary touring, but would not stand up to a long "blind," the points overheating, and in one case the insulator split when the engine was on full load. Having observed that—on the "Fritz" plugs, when cleaning in the ordinary way—the carbon started to collect first on the plug body adjacent to the point, I turned down an eighth of an inch of the screwed part of the body, so that the portion where the spark occurred was barely one millimetre thick, and thereafter the plugs ceased to sputter, though the engine was often swamped with oil. I suppose this thin rim, as it were, having the gases on both sides, kept hot enough to burn the oil off with the help of the spark. I give this tip for what it is worth to your readers.

B.E.F.

S. A. BUTTEAU.

## A PATRIOTIC OPTIMIST.

Sir,—I have been a reader of the "Blue 'Un" for the last seven years, and have never till now ventured to write. I have always followed the sport very keenly, and have ridden numerous makes. I have derived what motoring knowledge I possess from your valuable paper, coupled with a little practical work.

One thing I would like to mention most particularly is that I have been a keen follower of the different competitions, speed trials, etc., that were held in pre-war days. It has been most noticeable that American machines of the big twin class have consistently put up bigger speeds than British twins of the same power, except in a few cases.

In the  $3\frac{1}{2}$  h.p. class their machines cannot stand against ours, as witness the astonishing speeds of the Norton, A.B.C., Sunbeam, Scott, etc. Even now the American machines hold the records for all big track rides, and have put up the fastest speeds in the world.

Now I must admit that speed is not a vital factor, looking at the question from the average rider's standpoint. Consistent reliability and economy concern him more, and for this the British machine cannot be beaten. What I would like to point out is this, that I believe our machines are capable of taking all records from the Americans, both in speed and reliability. Such firms as the A.B.C., Triumph, Norton, Matchless, Rudge, etc., will no doubt turn their attention to the manufacture of big twins after the war (the end of which I do not think will be long), and I hope will be

able to beat all American records. I believe the manufacturers of the A.B.C. are already busy with a big H.O.2, which, to judge by what their  $3\frac{1}{2}$  h.p. model can do, must be exceptionally "hot stuff." Machines which consistently perform with success in speed and reliability trials are naturally brought to the notice of the motoring public, who are no doubt influenced in their choice of a machine by its performances in trials, etc.

In the opinion of some of your readers I may have spoken too strongly on this matter, but when I see the American machine praised and fêted on every hand, it exasperates me, knowing as I do that it is in no way superior to our machines.

The American motor cycle may be in the limelight now as regards speed, but it will have to look to its laurels when peace is proclaimed.

I may say I look forward every week to *The Motor Cycle*, and have only missed it a few times in seven years, even managing to get it regularly while in France. Trusting I have not taken up too much of your valuable space, and, as "Eldon" said recently, "I hope for a speedy return of the good old days on the open roads with something that can shift between one's knees."

BLERIOT.

Blackpool.

## A DOUBLE-ACTING FOUR-STROKE.

Sir,—I read with great interest in *The Motor Cycle* of August 2nd the article, "The Double-acting Four-stroke." This kind of engine has taken up a lot of my spare time, and I think my results are an improvement on those of Mr. Hinks, as indicated by his design. At least, I have overcome the fitting of the awkward piston rings he has in an outside piston by not having that kind of piston; I only need two sets of the ordinary rings. I have no inner cylinder, so do not generate that extra heat, and I think all the other faults mentioned arise from this. I have an extra piston heat, but I have an idea for internal cooling.

Perhaps Mr. Hinks would like to hear further. I am only a working mechanic, and have not much time and money with which to experiment, but for all that I take a great interest in every week's *Motor Cycle*, and digest all the information contained, so improving my 'bus, also my knowledge.

EDWARD S. BURSLEM.

## LADY MOTOR CYCLISTS.

Sir,—Knowing that you are interested in lady motor cyclists, I am enclosing a photograph of my wife mounted

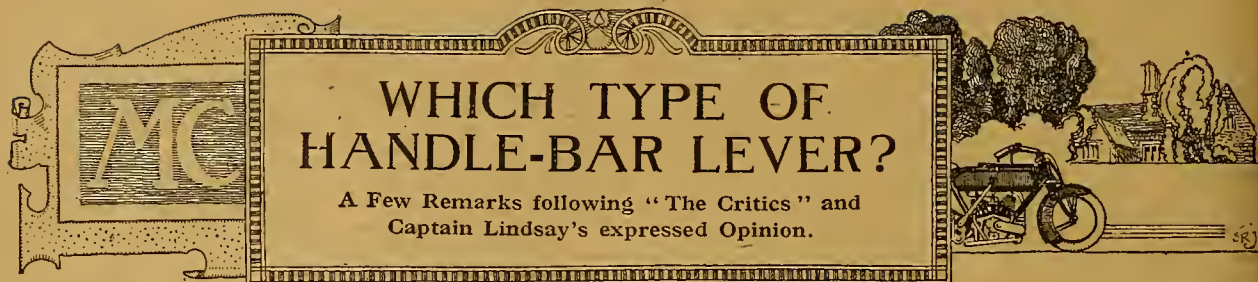


Mrs. Jenkins, an enthusiastic rider of a Douglas

on her T.T. Douglas, which she has ridden for the past two years. Her previous mount was a  $2\frac{1}{2}$  h.p. Jap-Royal Ruby, ladies' model, which gave every satisfaction.

ALEC H. JENKINS. Flight-Sgt. R.F.C.





## WHICH TYPE OF HANDLE-BAR LEVER?

A Few Remarks following "The Critics" and Captain Lindsay's expressed Opinion.

CAPT. LINDSAY has expressed his views on the matter of inverted controls in his usual practical way, and the fact that certain readers are entirely satisfied with the control of their machines does not in the least go towards proving that the system employed on the admittedly admirable mounts they quote is superlative. It is generally to be noticed, indeed, that the man who has stuck unwaveringly to any particular make is the first to pour forth the vitriol of sarcasm on designs other than his favourite, whereas he is really the last person on earth who is qualified to express a view.

The fact that, apart from expressing his own views, Capt. Lindsay backed up my statements renders it rather difficult to express an opinion which is entirely adverse to his, but this unhappily must be done. As regards the matter of delicacy of control, I do not think it is of much consequence whether the lever is "inverted" or "open." As a matter of fact, I recently did what Capt. Lindsay suggests, *i.e.*, attached the clutch cable to the left inverted lever of the light-weight I was riding, and found that the arrangement acted perfectly until the wire snapped at the nipple, when, of course, the "cussing" began. Incidentally, the experience demonstrated the vast superiority of the shape of lever employed in the ordinary inverted control to those shaped as in fig. 1—the ordinary outside or "open" type.

### Wide Angle Levers.

On my present mount the handle-bar clutch lever is of the type shown in fig. 1, and grasping the lever naturally one's grip falls between the points A and B on the almost vertical surface. The strength of one's first and second fingers is practically wasted, and in order to overcome this defect in design it is necessary to keep the cable so slack that the lever attains the position shown in dotted lines ere the clutch begins to lift. Only by doing this is delicacy of control possible, and it is conceivable that half the grumbles about stiff handle-bar clutches are chiefly the result of wide angle levers. On one or two Russian

military models I have recently ridden it is necessary entirely to relinquish one's left-hand control of the bars in order to reach down to the "point of leverage," and it must further be borne in mind that one's initial pull is directly upwards as shown by the line of the arrow, so that the leverage is not so great when the lever is at an angle from the bars as when the gripping surface is parallel with the bars. The best leverage, and consequently the greatest delicacy of control is obtained when the point of maximum leverage is moving directly towards the palm of the hand—with the hand in a natural and comfortable position—rather than at a tangent from it, and perfect control can only be obtained by perfect grip which, in turn, is dependent upon retaining possession of the bars by the hold of the thumb and the palm of the hand. Therefore, I think that delicacy depends not on whether the lever

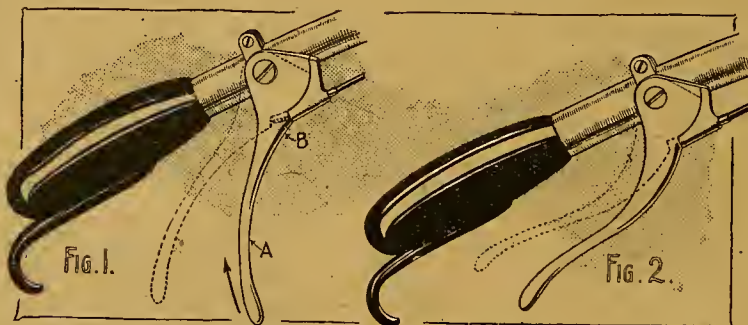


Fig. 1.—An undesirable type of lever. Not till it attains the position indicated by dotted lines is full leverage obtained.

Fig. 2.—A design of lever which gives maximum leverage with the hand in a natural position.

is inverted or "open," but upon the shape of the lever. The advantage of the outside system lies in its simplicity and accessibility, while the inverted, owing to its short centres, invariably snaps the cable at the nipple—a defect not yet touched upon.

Fig. 2 illustrates what can be taken as a desirable type of outside control

lever. Human fingers are not designed to obtain a grip on polished surfaces—in the first place they were probably designed to grip horizontal or almost horizontal branches—and the lever which is to give the best control should be parallel with the bars at the point where delicacy of manipulation (*i.e.*, the clutch slip point) is required. The lever shown is not quite horizontal; its first movement takes up the slack in the cable, and when the work really begins the lever is at the point at which it gives the best leverage and the most comfortable position for the fingers of the rider, *i.e.*, parallel with the hand. So long as sufficient lift is obtained, the shallower the reach the better, and—except in the case of a modern high efficiency flat twin with which type of engine it is necessary to finger the clutch almost in unison with the throttle—"Ixion's" observation that a foot control or a tank lever is preferable to a handle-bar clutch of poor leverage undoubtedly holds good. CHINOOK.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 29, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## Vibration.

The vibration of the handle-bars of my 2 h.p. four-stroke is terrific. Kindly tell me if a set of new springs would remedy this.—VIBRATION.

We presume you are referring to the fork springs. If the trouble is due to road vibration, new fork springs would be desirable. If, however, it is due to the engine, then all you can do is to have the engine balance checked by a first-class engineer.

## Running on Substitute.

As I have accidentally got hold of a half barrel of turpentine substitute, and am told that I could use it on my 4½ h.p. B.S.A. motor cycle (it is supposed to have a gravity of .785), should I have to make any alteration to my carburettor, or would it be any better if camphor or "Spots" or any of these other preparations were dissolved in it?—LISNALINCHY.

You could run quite well on the preparation mentioned, and you would probably require no further alterations than a warm air intake to your carburettor. It is usually necessary to start on petrol.

## Pillion Riding.

A friend of mine, who is at present incapacitated through an accident which he met with whilst riding a motor cycle on May 28th last, has requested me to write to you and put his case before you for your opinion. My friend was riding out from Barrow, and was on his correct side of the road, going round a curve, when a motor car collided with him. The driver of the car came round the curve towards Barrow, and, instead of keeping to his own side of the road, came straight across the middle of it, and ran into the motor cyclist, breaking his right leg and smashing up the cycle. My friend was travelling about 10 to 12 m.p.h., whilst the car was doing between 20 to 25 m.p.h. The road was about twenty feet wide at the place of the accident. The point I want to know is, seeing that my friend was carrying a lady passenger, on the motor cycle riding pillion, whether he would have a good case against the car owner?—H.W.M.


While we never recommend pillion riding, as we consider it risky on account of the possibility of mishaps of this sort, we do not think the fact that your friend was carrying a passenger should prevent

his succeeding in an action against the driver of the car, for, judging from your statement, the driver of the car was in error, and was the sole cause of the accident, which could not be in any way attributed to the carrying of a passenger.

## Lubricating the Chain.

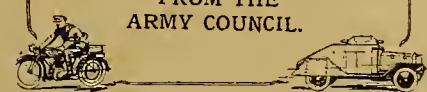
I am anxious about the best way to lubricate my motor cycle chain. It is protected (on the outside only) by an aluminium cover. Would you advise drilling this over the driving wheel from the engine, and screwing a small drip feed into the cover?—W.J.S.

The idea you suggest is a very good one, but we think you can improve on it. Fit a drip lubricator with a wick attachment, so that the wick touches the chain all the time. The wick will prevent an excessive amount of oil reaching the chain, and yet keep it always moist.



**"THE  
MOTOR CYCLE"**

**OBTAINED OVER 10,000  
RECRUITS VOLUNTARILY  
FOR THE ARMY MOTOR  
SECTIONS, INCLUDING THE  
FAMOUS TANKS. A LETTER  
OF APPRECIATION WAS  
SUBSEQUENTLY RECEIVED  
FROM THE  
ARMY COUNCIL.**



## Running on Coal Gas.

(1.) About what size would a bag have to be to hold coal gas to the equivalent of one gallon of gasoline? (2.) Is it possible to get refills for a Presto-light outfit in England?—CANTUCK.

(1.) Messrs. Andrew Barton have made a gas bag for a 2½ h.p. Douglas, 7ft. long by 2ft. in diameter, weighing fully inflated about 6 lb. This is sufficient to take the machine for ten miles. 250 cubic feet of gas are equivalent to one gallon of petrol. (2.) It is, unfortunately, not possible to get refills for Presto-light outfits in this country. The nearest approach we have to this system is the acetylene cylinder, sold by the Acetylene Illuminating Co., Ltd., who are now, like most other firms of this nature, working exclusively on war work.

## Fitting a Magneto.

I propose fitting an early type engine (Clement Garrard) with magneto ignition. The engine sprocket will be fitted on to the timing gear shaft, which rotates in an anti-clockwise direction. Will it be absolutely necessary to have an anti-clockwise magneto fitted, or can a magneto running the other way be used with slight alteration? If so, what alterations are necessary?—A.F.P.

If you are fitting a clockwise magneto it would be necessary to gear direct on to the magneto; that is to say, you would have two pinions, one on the half-time shaft running counter-clockwise, and the other on the magneto shaft running clockwise. If, however, you get hold of a magneto designed to run counter-clockwise, then you can use a chain. A counter-clockwise magneto or vice-versa can be altered by getting a new contact breaker from the makers.

## Cleaning Out the Crank Case.

(1.) To clean out the crank case of my 3½ h.p. 1916 Sunbeam without taking down the engine, is it necessary to add paraffin oil, or is draining through the drain tap sufficient? How much oil should be injected afterwards to lubricate? (2.) When running downhill with throttle lever in closed position, the engine appears to fire in the exhaust. Is this due to the valve springs? (3.) What would be the effect on the running of stretching out the valve springs? (4.) I have a small quantity of petrol purchased before the licences and restrictions came into force. Am I at liberty to use this quantity up, and can I be prosecuted if riding for pleasure it stopped?—W.P.R.

(1.) It is best to wash out the crank case with paraffin after the oil has drained out. Inject about three pumpfuls afterwards. This is explained in "Motor Cycles and How to Manage Them," which can be obtained, price 1s. 10d. post free, from these offices, or from any bookstall, 1s. 6d. (2.) The engine fires when the throttle is apparently closed probably because the throttle does not shut completely. The explosions can be prevented by fitting a switch. (3.) You might get some improvement, as this should cause the valves to close more quickly. Better try a new spring. (4.) You are at liberty to use the petrol you have by you for any purpose you desire.



### Fitting Oversize Tyres.

?

(1.) My motor cycle tyres at present are 28in. x 2in. I find a difficulty in obtaining these. Would 28in x 2 1/2 in. tyres fit the rims properly? (2.) Which, in your opinion, is the better way to stop a motor cycle—to use exhaust valve lifter or magneto switch? I understand the use of the exhaust lifter has a tendency to pit the valves and seatings.—AEON.

(1.) 2 1/2 in. tyres will fit 2in. rims without any difficulty. (2.) Close the throttle, raise the exhaust lifter and apply the brakes. This method of using the exhaust lifter in no way damages the valve or seating. What damages the seating is to use the exhaust lifter as a means of controlling the machine; that is to say, only partially raising it and allowing the engine to fire with the valve not reaching the seating.

### Difficult Starting.

?

I have a 1916 4 1/2 h.p. single, and it is impossible to start it by means of the kick starter. On pushing off it fires, but not easily. The magneto (C.A.V.) has been tested by the makers and found all right. When tested with the plug on cylinder it gives a good spark. I have failed to trace an air leak. I have just cleaned the cylinder and carburetter, but failed to cure this difficult starting. When I bought the machine new in June, 1916, I experienced the same difficulty in starting. I have tried one-point and two-point plugs, with the same result. I prime the cylinder well before trying to start the engine, but I find that the engine is rather heavy to turn round. What is the cause, and how can I remedy the trouble?—LEO.

Difficulty in starting is usually due to air leaks at the carburetter or induction pipe unions. To start easily it is necessary to have a strong mixture and a small quantity of it; therefore any leak in the air slides, round the inlet valve guide, or anywhere else which would cause the mixture to be weakened, would result in bad starting. Try the effect of placing a cloth or felt pad over the air intake when starting up. When flooding, this will absorb the overflow of petrol, and the air drawn through the pad will be very rich with gas. Big single-cylinder engines are often difficult to start.

### Decarbonising.

?

(1.) Having dismantled my engine, I find that inside the pistons is a rather large deposit of carbon. Not being able to remove the piston, having no appliances to take out the gudgeon pins, can I decarbonise by the oxygen process without fear of injuring the small end bearing? (2.) Having the cylinders dismantled, can I with safety decarbonise it by the oxygen process without replacing valves *in situ* or piston?—A.W.

(1.) Having dismantled your engine, and finding carbon deposit inside the piston, we think you can remove this fairly well without taking the piston off the connecting rod, provided you take sufficient care, by wrapping cloths over the crank case orifice, to prevent carbon from

reaching the interior of the engine, and scraping away the deposit. The oxygen process could be used quite successfully without fear of damaging the cylinders or bearings. (2.) You may use the oxygen process on the cylinder alone if you like, but we should advise you to be careful to apply the flame only to the carbon, keeping the flame moving; but there is no object whatever in using an oxygen flame to decarbonise when you have an engine down, as the carbon can be more safely and effectively scraped from the parts covered. The only object in employing the oxygen process is that it can be used without taking the engine down.

### A Mysterious Noise.

?

(1.) My 1915 Scott motor cycle has recently developed a regular metallic clank, which I have traced to the high gear chain apparently catching on something at the crank case end. The cause puzzles me, as the machine has only done, say, 5,000 miles, so it cannot well be sprocket wear, causing the chain to "bottom"; nor can the chain be at fault, for I have fitted a new one, and the trouble still continues. I have also reversed the connecting link, which is the proper size. Is it possible that the whole crankshaft can have shifted to the right; and if so, what is the cure? The crankshaft has never been tampered with. (2.) Also would play in the big end bearing cause the engine to heat? Lately the water has almost boiled on short runs, though everything else seems in order. The carburetter is a B. and B., and has a 42 jet. The timing is one tooth advance of the standard, the exhaust pipe, etc., is clean, the compression is fair, and the oil level is correct. I use Wakefield's Castrol "C."—M 7304.

(1.) We should say that the trouble is in all probability due to a worn sprocket. You say it is unlikely that this should happen in 5,000 miles, but we hardly think so, especially if you were unlucky enough to get hold of a sprocket of rather soft material. If you can obtain a new sprocket and fit it to your machine, we are inclined to think that the trouble will cease. Make sure that the countershaft is in proper alignment by measuring on either side from the edges of the crank case cover plates to the centres of the countershaft. (2.) You need not worry if the water almost boils, provided that it does not actually boil. If the water keeps just on boiling point, the engine will run its best. Probably when the weather gets a little cooler you will not be troubled in this respect. A loose big end would not cause the trouble; two-stroke engines often run splendidly with the bearings badly worn.

### READERS' REPLIES.

#### Difficulty in Starting.

With reference to "G.S.'s" query in your issue of August 16th, page 166, perhaps the following tip may help him. My 1916 B.S.A. (Binks carburetter) behaved in exactly the same manner as his machine, and could only be started by running. I traced the trouble to the difficulty of dropping the exhaust lifter quickly enough to take advantage of

the suction stroke. I always start first kick now. Work kick-starter until compression is felt. Then, with exhaust valve raised, gently turn engine just over top of compression stroke, and return kick-starter to top position. Now, without raising exhaust give a hefty kick, when engine should fire. Of course, the controls are in the usual starting position—spark two-thirds advanced, throttle about two-thirds open, and extra air closed. A small injection may be necessary.—E. HARDMAN.

#### A Two-stroke Defect.

With reference to "J.H.C.'s" query in your issue of August 16th, as it seems to have tried many ways of effecting a means to make his machine run correctly, may I be allowed to offer him a tip with regard to the Dixie magneto? A machine fitted with one of these magnetos would not fire the charge continuously, and no change of speed would result from any movement of the throttle. The general result would appear as a choked jet, although the latter and the plug are in quite good order. Finally, after hours of wasted energy, not forgetting time and temper, it was decided to dismantle the magneto again, and change round the permanent magnets. This was done, and away it went without a misfire or any portion of the machine having to be tuned up. This is caused by residual magnetism in the spindle and bearings acting in such a way as to cause the spark to lose intensity, thus causing misfiring, and I think if "J.H.C." tries this it may overcome his worrying defect.—L. J. HEALE.

#### NO ADDRESS.

If "T.T., Ely," who sent us a query on the 10th August, together with a stamped *unaddressed* envelope, will let us know to what address to send his reply we shall be pleased to give him the information he requires.

#### RECOMMENDED ROUTES.

BERKHAMSTED TO CARDIFF.—F.L.W.

Berkhamsted, Aylesbury, Bicester, Chipping Norton, Stow-on-the-Wold, Andoversford, Gloucester, Newnham, Lydney, Chepstow, Newport, Cardiff.

NEWPORT (MON.) TO READING.—B.C.

Newport, Chepstow, Lydney, Newnham, Gloucester, at the foot of Birdlip Hill turn left through Northleach, Burford, Witney, Oxford, Dorchester, Shillingford, Wallingford, Reading.

TONYPANDY TO CREWKERNE.—M.A.

Tonypandy, Pontypidd, Caerphilly, Newport, Chepstow, Lydney, Newnham, Gloucester, Stroud, Nailsworth, Bath, Radstock, Shepton Mallet, Ilchester, Crewkerne.

CANTERBURY TO STAFFORD.—S.K.

Canterbury, Charing, Maidstone, Wrotham, Lee, Old Kent Road, London Bridge, Moorgate Street, City Road, Highbury, Holloway, Finchley, Barnet, St. Albans, Dunstable, Towcester, Daventry, thence *via* Watling Street, through Kilsby, Cross-in-Hand, Smockington, Atherstone, Fazeley, Weeford, Lichfield, Armitage, Rugeley, Milford, Stafford.

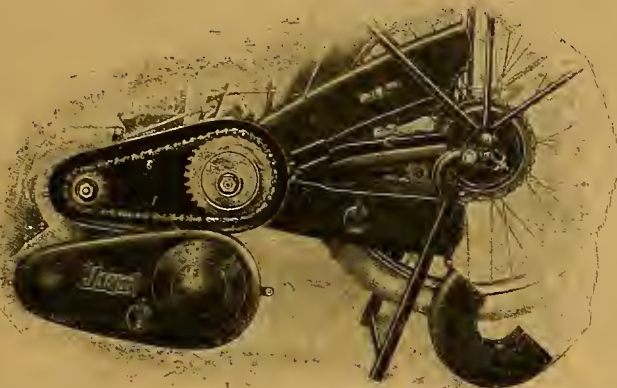




# THE RENOLD CHAIN



THE 4½ H.P. "JAMES"  
TRANSMISSION.



Renold Bush Roller  
Chains, No. 7,198.

HANS RENOLD, LTD.,  
DIDSBURY,  
MANCHESTER.

## AND THE MOTOR CYCLE

HANS RENOLD, LTD.,  
DIDSBURY,  
MANCHESTER.

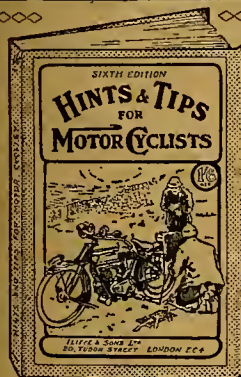
# Norton

—Because the famous 3½ and Big Four Norton Singles will embody many unique features which will reward these days of waiting.

NORTON MOTORS, LTD., Phillips St., Aston, Birmingham.

Telephone—East 590. Telegrams—Nortomo, Birmingham.  
Sole London and District Agents: G. B. BARTLETT & CO., 74, Gt. Portland Street, W.1.

*worth  
waiting  
for*



## A FRIEND IN MANY A TROUBLE

"HINTS AND TIPS FOR MOTOR CYCLISTS" is compact with useful information for the motor cycle user, and will be found "a handy book to have about you."

It covers all phases of motor cycling—buying, driving, adjustment, equipment, repair, garaging, etc.—and deals with all types of machines, as well as every part of the machine.

THE sixth edition (now on sale) has been thoroughly revised and is right up to date in every respect. A new feature is the inclusion of illustrations showing the working of motor cycle engines, both two-stroke and four-stroke.

There are over 400 separate paragraphs, with distinctive headings and numbers, and five-page index for ease of reference.

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**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd.**, and crossed **& Co.**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**A.J.S.** Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

**A.J.S.** 2½ h.p. 1912 Lightweight, just overhauled and enamelled; £20.—Ferndale, Colin Deep Lane, Hendon. [7197]

**A.J.S.** 1914, 6h.p., countershaft, 3 speeds, luxurious C.B. sidecar, in excellent condition throughout; £68.—58, Woodfield Rd., Ealing, W.S. [7181]

**A.J.S.** 1916 (June) 2-speed A.J.S. Lucas sets, horn, 24 speedometer, done 3,000, absolutely new condition; £47/10.—19, Mountfield, Prestwich. [X4436]

**A.J.S.** 6h.p., 3-speed, fitted with conchibuit Montgomery sidecar, electric head and rear lamps, smart combination; £68 only.—Merrick's Stores, 174, Listerhills Rd., Bradford. [7015]

**A.J.S.** 1915, 2½ h.p., 3-speed, clutch, T.T. bars, P. and H. head lamp, generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.I. [4203]

### Alldays.

**COLMORE** Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796]

**1917** Alldays Allon, 2-speed, 2-stroke, complete with all accessories and spares, not done 1,000 miles, as new; nearest offer £40 accepted.—Box L4,374, c/o The Motor Cycle. [7253]

**AT8** All letters relating to advertisements should quote the number at the end of each advertisement, and the date of the issue.



That's the name to remember if you are in doubt as to selection, or difficulty as to delivery of a Lightweight.

Call and select an economical mount from his fine selection. Unbiased advice—specially advantageous terms of payment.

Controlling Birmingham Agent for  
**INDIAN, ENFIELD, ROVER, BAT, NORTON, ZENITH, NEW IMPERIAL, A.J.S., CONNAUGHT, CALTHORPE.**

Also Agent for Triumph and James.

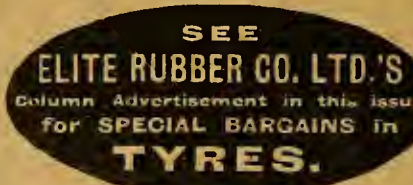
Here are a few models waiting your examination:—

<b>CONNAUGHT</b> , 2½ h.p., 2-st. £28 17 6	
<b>CONNAUGHT</b> , 2½ h.p., 2-speed £36 6	
<b>ENFIELD</b> , 2½ h.p., 2-sp., 2-st. 42 gns.	
<b>ENFIELD</b> , 3 h.p., twin, 2-speed 55 gns.	
<b>ENFIELD</b> Combination ..... 90 gns.	
(ENFIELD) Combination, NORTON, B.S.A., and TRIUMPH models can be supplied with Ministry Permit or Class A Certificate.)	
<b>JAMES</b> , 3½ h.p., 3-sp., twin .. £69 10	
<b>JAMES</b> , 4½ h.p., Combination £86 6	
<b>NEW IMPERIAL</b> , 2½ h.p., 2-sp. £40 19	
<b>NEW IMPERIAL</b> , 2½ h.p., clutch £48 6	
<b>NEW IMPERIAL</b> , Lady's .... £50 8	
<b>ROVER</b> , 3½ h.p., T.T., Philipson ..... £62/17/6	
<b>ROVER</b> , 3½ h.p., T.T. racer. .. £57 10	
<b>ROVER</b> , 3½ h.p., c'nt'rsb'ft, 3-sp £73 10	
<b>ROVER</b> , 3½ h.p., 3-sp. Comb... £94 10	
<b>CALTHORPE-J.A.P.</b> , 2-speed £39 18	
<b>CALTHORPE</b> , lady's, 2-speed £37 16	
<b>CALTHORPE</b> , 3½ h.p., coach Combination ..... 70 gns.	

Arrange to call as early as possible—but note that we close at 1 on Saturdays.

**P. J. EVANS,**  
87-91, John Bright Street,  
**BIRMINGHAM.**

'Phone: Mid. 602. Wires: Lytcar, B'ham



'Hints and Tips for Motor Cyclists.'

Brinful of useful information.

Price 1/6

By post 1/8

Home or abroad.

**ILIFFE & SONS LTD., 20, Tudor St., E.C.4.**

## MOTOR CYCLES FOR SALE.

### Alldays.

**ALLON**, 2½ h.p., 1915, 2-stroke; £25; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [6]

**ALLON**, 1915-16, 2-speed, new tyres, speedometer, very powerful on substitute; great bargain, £248, Drakett Rd., Brockley. [7]

**ALLDAYS** Matchless, 3½ h.p., 3 speeds, counterash combination, in nice condition; £40.—Perry Co., 337, Euston Rd., London. [7]

**LATE** 1916 Alldays Allon, 2½ h.p., single-speed, splendid condition; £25.—Elce and Co., 15, Bishopsgate Av., Camomile St., E.C.3. [10]

**ALLON**, 1915, 2-speed, 2-stroke, pan saddle, £39/ single speed (new), £36; 2-speed, new, £42; 2-sp and hand clutch, new, £48; extended payments or change.—Service Co., 292, High Holborn. [X4]

**ALLDAYS** Allon.—We have just received some 1 but slightly soiled models for sale at discount from 10% to 20%.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7]

**ALLON** (new), 2½ h.p., 2-stroke, the stout-hearted lightweight, single-speed, 2-speed and clutch models in stock; extended payments arranged Harrods Motor Showrooms, 118, Brompton London, S.W.1. [7]

### Ariel.

**ARIEL**, 3½ h.p., 1917, 3-speed countershaft model in stock.—Crow Bros., Guildford. [2]

**COLMORE** Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [10]

**1917** Ariel, 3½ h.p., 3-speed, decompressor, spring pillar, brand new, not used; listed £72, p. £65.—10, Bartholomew St., Ipswich. [7]

**ARIEL**, 3½ h.p., late 1913, single speed, with oil built sidecar, excellent condition; £28.—Brofield, Middle St. Farn, Bishopstoke, Hants. [X4]

**ARIEL** 3½ h.p. Combination, 1912, 3-speed, 1 tyres, nice condition, £28; and Triumph, h.p., 1911, renovated, free engine.—Smith, 397, H St., Lewisham, S.E. [7]

**ARIEL**, late 1914, 5-6 h.p., 3-speed, kick start, Culler sidecar, hood, and wind screen, petrol can watch, speedometer, good tyres, numerous spares, a condition; £60.—13, Collingwood St., Blackfriars. [7]

**ARIEL**, 1915, 3-speed, and clutch, 3-6 h.p., up seat-pillar, Dunlop tyres, hood and screen, L lamp and Cowey speedometer; £71/15; extended payments or exchange.—Service Co., 292, High Holborn. [X4]

**ARIEL** (new), 3½ h.p., 3-speed countershaft gear clutch and kick starter, decompressor, petrol spring seat pillar; £72; extended payments arranged Harrods Motor Showrooms, 118, Brompton London, S.W.1. [7]

**ARIEL**, 1915-16, 3½ h.p., 3-speed countershaft combination, Ariel sidecar, speedometer, 3 lamps, condition as new, original tyres still on, £72/10; new 1917 3½ h.p. solo model in stock, £72/10.—Lamb, 151, High St., Walthamstow, and 50, High Rd., W Green, N. [7]

### Arno.

**1915** 3½ h.p. Arno, 3-speed, hand clutch, condition and order as new; £24.—S., 24, Tudor Gate, Barnes. [7]

### Auto-Wheels.

**WALL** Auto-Wheel, good order, just overhauled.—Harper, 228a, High St., West Bromwich. [X4]

### Bat.

**BAT-J.A.P.** 6h.p. Brooklands, overhead valve, speed clutch model, Bramble sidecar, fully equipped; £42.—St. Margaret's, Solway Rd., E. Dulwich. [7]

### Bradbury.

**BRADBURY**, 1912, 3½ h.p., 2 speeds, chain drive, free engine; £25/10.—Motor Exchange, Hoxton, Halifax. [7]

**1911** 4h.p. Bradbury 2-speed combination, speedometer; £23/10; exchange Triumph—53, Brockhill Rd., Cardiff. [7]

**BRADBURY**, 1911, 4½ h.p., single-speed, T.T. bars, £20.—Elce and Co., 15-16, Bishopsgate, Camomile St., E.C.3. [7]

**BRADBURY**, 1913, T.T. clutch, recently overhauled, new front tyre, Lucas lamps, £19, or near offer, Write, Box L4,376, c/o The Motor Cycle. [6]

### Brough.

**1915** 3½ h.p. Brough, flat twin, 2-speed, Miller & Watford speedometer, tyres unrun, had few months' use, total mileage 2,300, fast, reliable machine; £40.—Collins, 44, Kingston Rd., Portman. [7]

**1916** T.T. 3½ h.p. 2-speed Brough, lamps, trip odometer, spare leather belt, excellent condition, small mileage, original tyres scarcely worn, very all accessories; owner bought car; £53, or nearest, £4,346, c/o The Motor Cycle. [7]



## MOTOR CYCLES FOR SALE.

## Brough.

IDER TROWARD'S, 31 and 78, High St., Hampstead.—Brough, 1916, twin, Sturmer-Archer 3-speed countershaft; 59 gns. (1) [7077]

## B.S.A.

S.A., brand new, 4½ h.p., 3 speeds, in stock.

S.A., 1916, 4½ h.p., all-chain, 3 speeds.

S.A., 1916, 4½ h.p., 3 speeds, combination.

S.A., 1915, 4½ h.p., 3 speeds, combination.—Percy and Co., 337, Euston Rd., London. [7282]

OLMORE Depots 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798]

S.A. Combination, splendid condition; sacrifice £38; called up.—Fairhurst, Rylands Row, Wigan. [X4469]

S.A. New 1917 Model K's in stock; 264.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888]

16 B.S.A., 4½ h.p., 3-speed, model H; £50.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492]

S.A., 3½ h.p., 1912, free engine, with T.T. handlebar, excellent order; £26.—Eagles and Co., High Acton, W.3. [X4449]

S.A. Late 1914 Combination, 3-speed countershaft, chain driven, lovely order; 45 gns.—Wilmer, Cool Merchant, Swindon. [X4389]

S.A., 1913, free engine clutch, new inner tubes and overhauls, etc., good condition; £25.—69, West 1, Dartford, Kent. [7017]

S.A. 1916 (Nov.) Combination, chain-cum-belt, all accessories, spares, as new; 60 gns.—Mitchell, Grosvenor House, Lymington. [X4391]

S.A., 4½ h.p., 1915 Model H, 3 speeds, all chain drive; £48; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7003]

S.A., 4½ h.p., 1914, Model K, 3 speeds, chain-cum-belt drive; £40; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7002]

S.A., 4½ h.p., 1914-15, perfect condition, splendid running order, Dunlop extra heavy tyres, Brooks, sps. and spare belt, etc.; £36.—Morris, 175, Mare Hackney. [7031]

S.A., 4½ h.p., 1916, 3-speed, lamps, speedometer, petrol carrier, Sunbeam sidecar, good tyres, spares, good condition; £67/10.—C. Beard, 14, Collingwood Blackfriars. [7028]

ATE 1916 B.S.A., 4½ h.p., chain drive, and Watson Model N sidecar, luggage carrier, accessories, condition, mechanically perfect; 60 gns.—Lewis, 45, St. Fleur de Lis, Mon. [X4366]

S.A., genuine, 1916, 4½ h.p., mag., 3 speeds, kick, countershaft, runs well; greatest bargain in London; 45 gns. cash.—Wandsworth Motor Exchange, Aer St., Wandsworth (Town Station). [7113]

S.A., 1917 Model H, 4½ h.p., all chain drive, 3-speed countershaft, kick starter, coachbuilt sidecar, screen, carrier, Lucas horn, tools, spares, etc., fine fit, and a real bargain, £73 cash.—Box 1,152, c/o Motor Cycle. [X4209]

## Calthorpe.

OLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

ENUINE 1914 Calthorpe Lightweight, 4-stroke, 2-speed, clutch, perfect order; £12/10.—Glass, 147, Highbart Lane, Barnes. [7255]

16 Calthorpe, 2-speed, 2-stroke, new Dunlops, accessories, excellent running and condition; bargain, £25.—75, Edridge Rd., Croydon. [X4475]

ALTHORPE, 1917 J.A.P., latest model, brand new, Enfield 2-speed, in stock; 39 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7059]

ALTHORPE-J.A.P., 1916, 4 h.p. twin combination, Enfield gear, 3 electric lamps, in splendid condition; £63.—58, Woodfield Rd., Ealing, W.5. [7182]

ALTHORPE, 1917, 2-stroke, Enfield 2-speed, latest model; 34 gns.; brand new, in stock.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7060]

ALTHORPE, 2½ h.p., 1915, 2-stroke, 2 speeds, lamps and horn; £27; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [6997]

ALTHORPE 2-stroke, Enfield 2-speed, new, but slightly shop-soiled; special bargain, 30 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7061]

ALTHORPE-J.A.P., 1915, 2-speed model, all accessories, unused last 18 months; £28/10; plating and paint perfect.—Lamb's, 151, High St., Walthamstow, E.10, High Rd., Wood Green, N. [7248]

## Campion.

AMPION-VILLIERS 2-stroke, 1916, 2-speed model, excellent condition, and equal to new; 25 gns.—Higman Bros., King St., Acton. Phone: 1578 Chiswick. [7265]

AMPION-J.A.P., 1916, twin, countershaft gear, chain drive, kick starter, 3 speeds, lamp, speedometer, watch, coach sidecar, all as new; cost £90, will be £68.—Swallow, Spittlegate, Grantham. [X4302]



## NEW MACHINES ACTUALLY ON SHOW.

ENFIELD 1917 6 h.p. Tradesman's Outfit (If additional Touring Sidecar required, £15 extra).  
ENFIELD, 1917, 2½ h.p., 2-speed, 2-stroke £44 2  
ROVER, 1917, 3½ h.p., 3-sp., countershaft Combination, with Sidecar ..... £99 4/6  
JAMES, 1917, 3½ h.p. twin, 3-speed ..... £69 10  
JAMES, 1917, 4½ h.p., No. 6, 3-sp. Comb. £87 2  
ARIEL, 1917, 3½ h.p., 3-sp. Combination £93 10  
LEVIS, 1917, 2½ h.p., 2-speed, Model E ..... £47 10  
LEVIS Popular Model ..... £32 0  
CALTHORPE-J.A.P., 1917, 2½ h.p., 2-speed, Enfield Sidecar ..... £39 16  
CALTHORPE-J.A.P., 1917, 2½ h.p., 2-speed, with Sidecar ..... £50 0  
ALLDAYS ALLON. All models from ..... £37 10  
ROYAL RUBY. All models from ..... £32 10  
MATCHLESS, War Model, 7 h.p., 3-speed, spare wheel ..... £120 0

## SECOND-HANDS.

ENFIELD, very late 1916, 6 h.p., Combination, dynamo lighting, condition very fine ..... £110 0  
ENFIELD, 1916, 6 h.p. Combination, lamps, hood, speedometer, sereca ..... £84 0  
ENFIELD, 1917, 3 h.p. twin, semi-T.T., 2-speed model, with sporting Canoelet Sidecar ..... £69 10  
ENFIELD, 1916, 6 h.p. Comb. and access. £80 0  
ENFIELD, genuine 1917, 6 h.p. Combination, speedometer, lamp, and horn, scarcely used ..... £100 0  
ENFIELD, 1914, 6 h.p. Combination, 3 lamps, horn, engine just been overhauled ..... £68 10  
ENFIELD, 1916, 8 h.p. Combination, 2-sp., ex works Aug. 1916, original oversize tyres still on, speedometer, Lucas best lamps converted to electricity, condition like 1917 ..... £89 10  
ENFIELD, 1916, 6 h.p. best Lucas accessories, speedometer, condition like 1917 MATCHLESS, M.A.G. engine, 8B, 7 h.p. Combination, Lucas accessories ..... £89 10  
MATCHLESS, 1914, 8 h.p. J.A.P. Combination, speedometer, lamps, and horn ..... £25 10  
INDIAN, 1915-16, 7-9 h.p., clutch model, T.T. bars, disc wheel, with lamps and horn, ridden approximately 1,000 miles TRIUMPH, 1913, 3½ h.p., semi-T.T. bars. A nice little solo mount ..... £35 0  
TRIUMPH, 1914, 4 h.p., 3-sp., Sturmer-Archer gear, Millford Sidecar, speedometer, lamps ..... £48 10  
ALLON, 1916 model, 2½ h.p., 2-sp., hand clutch, just overhauled by makers ..... £25 10  
ALLON, 1917 model, 2½ h.p., 2-sp., hand clutch, full kit tools, and Stewart warning horn, ridden 200 miles only ..... £43 0  
A.J.S., 1915, 4 h.p., 3-sp. Combination, all accessories, in excellent order ..... £20 0  
O.K. JUNIOR, 1914, 2-stroke ..... £23 10  
LEVIS, 1915, Popular model ..... £23 10  
DOUGLAS, 1914, 2-sp., kick-starter model, all accessories ..... —  
HARLEY-DAVIDSON, 1917, electric model, genuine H.-D. "C" Sidecar, new April last, original tyres still on ..... —  
HARLEY-DAVIDSON, 1915, electric model, and Phoenix Sidecar ..... —  
HARLEY-DAVIDSON, 1916, electric model, genuine H.-D. "E" Sidecar ..... —

## WANTED.

SALESMAN and JUNIOR SALESMAN.—Progressive position to right man. Easy berth, with plenty of scope. Wages immaterial. FORD VAN, not earlier than 1915. QUICKLY.—HARLEY-DAVIDSON Combination or Solo, 1915-16 either model; also B.S.A. Solo or Combination.

## LAMB'S,

151, HIGH ST., WALTHAMSTOW, N.E.

Phone: Walthamstow 169. 5 minutes Hqs St. (C.E.R.)

Also at 50, HIGH RD., WOOD GREEN, N.

Only depot in this district. Phone: Hornsey 1956. Hours—9 to 6. Thursdays, 1 o'clock.

## MOTOR CYCLES FOR SALE.

## Campion.

CAMPION, 1917, 6 h.p. J.A.P., 4-speed gear box, combination, almost as new; £35.—Percy and Co., 337, Euston Rd., London. [7283]

## Chater-Jap.

8 h.p. Chater-Jap Combination, 3-speed, Bosch mag., tyres good as new, just been overhauled, new piston rings, speedometer, lamps, horn, in splendid order; would exchange for lower power, with cash adjustment either way; genuine offer.—Bellows, 71, Station Rd., Plumstead. [7215]

## Chater-Lea.

CHATER-LEA, 3½ h.p., B. and B. carburettor, Bosch mag., Dunlop tyre; £12; owner joining up; seen after 7, or after 1 Thursday (side door).—Belchem, 273, High St., Borough, S.E.1. [6961]

## Chater-Lea-Fafair.

3 h.p. Fafair, Chater-Lea, in excellent condition and order, with 5 gallon petrol; trial; £10.—Fairlight, 22, Katherine Rd., East Ham. [6953]

NO. 9 Chater-Lea, 6 h.p. twin Fafair, N.S.U. 2-speed gear, late 1913, New Hudson 15 gu. sidecar, V.M. Pillion seat, new heavy tyres, 650x65, engine spares, all accessories, most reliable outfit, everything fine condition; trial; £37.—Naphthine, 15, Cecil Rd., Hendon, N.W.9. [7036]

## Clyno.

CLYNO 6 h.p., 2-speed, kick starter, and coachbuilt sidecar; £50; any trial here.—Shuttleworth, Clare Rd., Maidenhead. [X4335]

CLYNO 2-stroke, not used for 2 years, engine wants assembling; very cheap, 12 gns.; seen Sunday.—16, Glenham Rd., Castelnaup, Barnes. [6951]

CLYNO Motor Cycle and Sidecar, 5-6 h.p., 2-speed, clutch, speedometer, and lamps, sound condition; £45.—Wright, 17, George St., Hove. [7145]

CLYNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham and Manchester; inclusive price with spare wheel, 100 gns. [0884]

CLYNO 6 h.p. 1914 Combination, sporting sidecar, disc wheels, Lucas electric lighting set and electric horn; £65; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [6998]

1915 Clyno Combination, detachable wheels, 3-speed countershaft, clutch, kick starter, one new tyre, complete with lamps, Lucas horn, and usual accessories; £52/10.—Sims, Preston, Hitchin, Herts. [X4309]

CLYNO 6 h.p. Combination, 1913, 2-speed, kick starter, well cared for, and in perfect condition, Dunlops, special 2-seater body, standard chassis, wind screen, accessories, spares; trial or expert examination invited; accept £46, no offers; petrol if required; seen any time.—98, Tulse Hill, S.W.2. [7251]

## Connaught.

CONNAUGHT, 2½ h.p., 1915, 2-stroke, T.T. handlebar, variable ignition, all accessories; £20.—Eagles and Co., High St., Acton, W.3. [X4451]

CONNAUGHT, 2-speed, 2-stroke, 1915, not run 700 miles, in excellent condition; £34, no offers.—Howard Smallman, Garage, Sutton, Surrey. Phone: 1000 Sutton. [X4415]

CONNAUGHT Motor Bike, 1915, 5 h.p., Amac carburettor, U.H. mag., footboards, condition equal to new; £22 nett.—Halliwell, White Gate, Edgworth, near Bolton. [X4455]

CONNAUGHT Miniature, single speed, £33/17/6, ditto, 2-speed, £41/6/6; standard 2-speed, £44/9; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4153]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new; 42 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4151]

COVENTRY Eagle, new 1917 model, 2-speed, 2-stroke, in stock; 40 gns.—Rider Troward's, 31 and 78, High St., Hampstead. [7074]

COVENTRY Eagle (new), 2½ h.p. Villiers 2-stroke engine, 2-speed countershaft gear, Brampton forks, Dunlop non-skid tyres, completely equipped with lamps, horn, etc., ready for the road; £42; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [7227]

## Dalm.

DALM, 2-stroke, a topping machine, as new; £25.—Lieut. Ireland, Castle Hill Lodge, Church Rd., Upper Norwood, S.E.19. [6868]

## Dayton.

1916 Dayton 2-stroke Lightweight, good running order; £13.—Manners, Basingthorpe, Grantham. [X4377]

## Douglas.

1915 Douglas, 2½ h.p., 3-speed, horn, in very good condition; £48/10.—Belov. [7212]

1912 Douglas, 2½ h.p., single-speed, lamps, horn, speedometer; £17/10.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0480]

1912 Douglas, 2-speed, clutch, numerous tools; £24.—38, Diseworth St., Leicester. [X4428]

DOUGLAS, 1912-13, 2-speed, 2½ h.p., good appearance, fast, being ridden daily; £23/15.—30, Glebe Rd., Barnes, S.W. [7212]



## MOTOR CYCLES FOR SALE.

## Douglas.

DOUGLAS 4h.p. 1916 Combination, 3 speeds.

DOUGLAS 4h.p. 1915 Combination, 3 speeds.

DOUGLAS, 2½h.p., 1916, 3 speeds.

DOUGLAS, 2½h.p., 1915, 2 speeds.

DOUGLAS, 2½h.p., 1914, 2 speeds.

DOUGLAS, 1913, 2 speeds.

DOUGLAS, 1912, 2 speeds.

DOUGLAS, 1911, 2 speeds; all in perfect order and condition throughout.—Percy and Co., 337, Euston Rd., London. [7287]

1915 Douglas, single speed, new Dunlop tyre; £19/10.—Robinson, Sandy, Bedfordshire. [7107]

DOUGLAS 1915 2½h.p. Twin, mag., 3 speeds; 38 gns.—I, Ebner St., Wandsworth. [7114]

DOUGLAS, 1912, 2½h.p., Bosch, Amac, 2 speeds; £27.—24, Argyll Rd., Westcliff-on-Sea. [X4417]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, 1914 (late), 4h.p. combination, excellent condition; 48 gns.—117, Hazelbank Rd., Catford, S.E.6. [7099]

1914 Douglas, 2½h.p., 2-speed, Philpott pulley; £45.—W. and H. Motor Co., Ltd., Deansgate, Manchester. [7188]

DOUGLAS, 1914, 2½h.p., full accessories, perfect condition; £36.—Robie, The Portlands, Lindley, Huddersfield. [X4299]

1914 T.T. 2-speed Douglas, lamps, tyres, and belt, as new, grand condition; £37.—The Oak, Cann Hall Rd., Leytonstone. [7218]

DOUGLAS, Xmas, 1914, 3½h.p., capital condition, clutch, kick-starter; £50.—Capt. Dodd, Highwood Schools, Brentwood. [7144]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

DOUGLAS, 1913, 2½h.p., 2 speeds, T.T. handle-bars, £31/10; 1912 2½h.p., 19 gns.—Motor Exchange, Horton St., Halifax. [7047]

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [7080]

DOUGLAS, 1913, 2-speed, Bosch mag.; £35/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4142]

DOUGLAS, 4h.p., 2-speed, clutch, kick start, coach sidecar, perfect; £72.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6759]

DOUGLAS 2½h.p. 1910 Twin, lamps and horn; £15; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [6993]

DOUGLAS, 1913-14, 2-speed, excellent running machine, perfect condition; 29 gns.—Kington, 223b, Hammersmith Rd., London, W. [7121]

DOUGLAS 2½h.p. 1913 Twin, 2 speeds; £30; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [6994]

DOUGLAS 2½h.p. 1915 Twin, 2 speeds; £45; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [6995]

DOUGLAS, late 1914, 2½h.p., 2-speed, lamp, horn, Stewart speedometer, spare new valves, chain, tube, mileage 2,000; £34.—Meakins, Lynton, Devon. [X4310]

DOUGLAS W Model, 2½h.p., 2 speeds, K.S., purchased 1916, very fast, been stored; owner army; 800 mileage, as new; 38 gns.—124, Upper Tooting Rd., S.W. [6983]

DOUGLAS 4h.p. Combination, 1915-16, coach sidecar, 3-speed, kick starter, valuable accessories, condition as new; price £65.—Owner, 86, High St., Bromley, Kent. [7220]

DOUGLAS, late 1915, 2-speed, clutch, perfect condition, under 2,000, lamps, speedometer; £43; exchange Indian, Harley combination.—Lieut. Bridge, Bedford, Felixstowe. [7219]

DOUGLAS, 2½h.p., 1913 (2-speed), new Lucas lamps, generator, horn, has not been used for 2 years, as new; £32, or offer.—Smith, Charlton Villa, Staines Rd., Bedford, Middlesex. [7095]

DOUGLAS, 1914, 2½h.p. War Model, 2-speed, engine, tyres, belt in excellent condition, just overhauled, Grado vaporiser fitted; 40 gns.—Stanley Jones, New Milton Hotel, New Milton, Hants. [7102]

DOUGLAS, 1913, 2½h.p., 2-speed, clutch, kick starter, lamps, speedometer, and all accessories, tyres perfect, lovely condition; 30 gns.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [7208]

LATE 1916 2½h.p. Douglas, 2 speeds, semi T.T. bars, Pedley pneumatic grips, latest Amac carburettor, designed for substitute, original tyres, mileage 600, enamel and plating unscratched, lamps, knee-grips, etc.; £50, or near.—Stratton, Mount Pleasant, Redditch. [6981]

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## Douglas.

DOUGLAS, 4h.p., 1915-16, 3-speed, kick starter, fuel or hand controlled clutch, semi T.T. bars, Bin carburettor, hot air attachment, lamps, horn, tools, new tyres, complete, with Douglas sidecar, outfit absolutely new condition; 30 gns., or part exchange; h.p. 1914 Douglas.—Powell, Upton Court, Ross, W. Oxfordshire. [X44]

2½h.p. Douglas, absolutely new; immediate delivery 24 models U, V, W, clutch, kick start, again priority permits, for doctors, farmers, war and munition workers. How and where to apply.—For particulars, write to the Douglas Specialists, Robson's Garage, Green St., Cambridge. Tel.: 388. T.A. Bicycles. [71]

## Edmund.

EDMUNDS (new), 2½h.p. J.A.P., Royal Enfield speed, spring frame, double tank, strongly built machine; £54/12/6; extended payments arranged Harrods Motor Showrooms, 118, Brompton Rd, London, S.W.1. [72]

## Enfield.

ENFIELD Combination, 1916, 6h.p.; £65.—41, Grosvenor Rd., North Finchley. [70]

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below. [71]

ENFIELD 3h.p. Twin; £57/10; and 2½h.p. 2-stroke; £45; delivery from stock.—Exeter Motor Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., 2, month. [68]

COLMORE Depot, 31, Colmore Row, Birmingham for immediate delivery of Enfields. [68]

1916 3h.p. Enfield, 2-speed, done 800 miles, condition new; 42 gns.—Butler, 29, Pierrepont Rd., Acton, W.5. [72]

ENFIELD 1916 6h.p. Combination, splendid condition; £80, or close offer.—58, Woodfield Rd., Ealing, W.5. [71]

ROYAL Enfield, late 1915, 3h.p., 2-speed, K. clutch, splendid condition; £34/15.—49, Chestnut St., Southport. [X44]

ENFIELD, 1913, 2½h.p., chain drive, 2-speed, good running order; £16/10.—G. Jeffery, 1, Beddington Villas, Southbury Rd., Enfield. [71]

ROYAL Enfield 3h.p. 1915 Twin, 2 speeds; £40; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [69]

ROYAL Enfield, 2½h.p., 1916, 2-stroke, 2 speed; £38; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [69]

ENFIELD, late 1914, 2-seater sidecar, condition new, very little used; trial given, or would separately; offers.—35, Church St., Twickenham. [69]

1915 Enfield, 3h.p., speedometer, lamps, horn, excellent condition throughout; £38.—Elice &amp; Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [70]

ROYAL Enfield 3h.p. 1917 Twin, 2 speeds, lamp, horn, and speedometer; £50; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [69]

6h.p. Enfield Combination, excellent running order and condition, speedometer, lamps, etc., include bargain; appointment.—Carter, 29, Gabriel St., London, S.E.23. [71]

RIDER TROWARD'S, 31 and 78, High St., Haverstock Hill, 1917 De Luxe Enfield combination, horn, screen, luggage grid, Lucas dynamo lighting, as new 92 gns. (D). [70]

6h.p. 1916 Enfield Combination, new condition, horn, screen, lamp, wind screen, luggage carrier, tool spares, speedometer; £35, no offers.—76, Lordship Ln., East Dulwich, S.E. [69]

ENFIELD, 6h.p., late 1914, 2-speed, handle start, good tyres, coachbuilt sidecar, head lamp, generator, rear lamp, fully equipped, and perfect throughout bargain, £65. Below. [71]

ENFIELD, 2½h.p., 1914, 2-speed, kick starter, chain drive, Enfield grey, good tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout; bargain, £34.—Meekes and Meekes, 11, Gt. Portland St., W.1. [72]

ROYAL Enfield 6h.p. Combination, in fine condition, as new, mileage under 3,500, tyres unrun, speedometer, lamps, full kit tools, luggage grill; price £65.—Apply, Box L4375, c/o The Motor Cycle. [72]

ROYAL Enfield 6h.p. 1916 Combination, Lucas dynamo lighting set, electric horn, speedometer hood and wind screen, as new; £105; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [69]

1916 6h.p. Enfield Combination, lamps, horn, speedometer, watch, tools, spares, Binks auxiliary tank, run 3,700, repainted, overhauled, insured August, 1918; £82; seen any time.—Walker's Garage, Carlton St., Portman Sq., W.1. (D). [71]

ENFIELDS.—We have seven combinations actually stock, 1915, 1914, 1915, 1916, 1917, from £48/10 to £110 for electric model; also brand new 1917 6h.p. model in stock, £115; and a 1916 6h.p. model, original oversize tyres still on; prices and details in full on application.—Lamb's, 151, High St., Walthamstow and 50, High Rd., Wood Green, N. [72]



## MOTOR CYCLES FOR SALE.

## Enfield.

**ENFIELD** 1916 Combination, 6h.p., 2-speed, combined clutch, Amac carburettor, Bosch mag., fitted with mechanical horn and speedometer, only done 2,000 miles, £90; 1915 combination, 6h.p., 2-speed, clutch, Thompson-Bennett mag., Amac carburettor, fitted with lamps, Stewart speedometer, and horn, £87/10; E.P. exchange.—Service Co., 292, High Holborn, London. [X4119]

## Excelsior.

**1915** American Excelsior, De Luxe Model, only done 2,500; £85 cash.—Box L4,357, c/o *The Motor Cycle*. [6979]

**RIDER TROWARD'S**, 31 and 78, High St., Hampstead.—Excelsior, British, 1914, 4½h.p., 2-speed outershaft; 37 gns. (D) [7078]

**7-9h.p.** American Excelsior Combination, electric lights, horn, in perfect condition, many spares; £70.—Sellers, Motor Cycle Specialist, Dorchester. [7270]

**EXCELSIORS**—All models in stock; magneto model £75, electric lighting model £85; get a big X. You'll be satisfied.—Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester. [X1462]

**AMERICAN** Excelsior, 1915, 7-9h.p., 3-speed, 18 in. gn. underslung couch sidecar, dynamo lighting, dealer lamp, electric horn, speedometer, mileage 5,000, new; 69 gns.—Rider Troward's, 31 and 78, High St., Hampstead. (D) [7073]

## F.N.

**6-h.p.** F.N. Coachbuilt Combination, 2-speed, screen, lamps, and spares, in splendid condition; any trial; 25-6, Solehurst Rd., Crofton Park, Brockley, S.E. [7037]

**F.N.**, 5-6h.p., 1913-14, 2-speed, clutch, folding sidecar, in perfect condition, fully equipped; £40, or near offer.—Kerford, 27, Wilson Patten St., Warrington. [X4338]

**F.N.** (late model), 5-6h.p., 4-cyl., waterproof Bosch, 2 speeds, dropped frame, enamelled red, looks like new; 29 gns.—Wandsworth Motor Exchange, 101, Wandsworth (Town Station). [7115]

## Harley-Davidson.

**1917** Harley-Davidson Combination, fully equipped; £82.—Butler, 29, Pierrepont Rd., Acton. [7201]

**1917** Harley-Davidson Combination, olive, only done 600 miles; £110.—Sellers, Motor Cycle Specialist, Dorchester. [7268]

**HARLEY-DAVIDSON**, 1916 model, as new, and perfect; £70.—Longman Bros., King St., Acton. Phone: 1578 Chiswick. [7262]

**HARLEY-DAVIDSON** Combination, 1915, dynamo lighting, beautiful condition; £70.—Smith, 45, footpeller Rd., Kentish Town. [7086]

**COLMORE** Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [6802]

**HARLEY-DAVIDSON**, 1917 magneto model, done 500 miles; 7-9h.p., insurance transferable, as new; 86-6, Brighton Terrace, Itchen, near Southampton. [6956]

**1917** Harley-Davidson, electric, De Luxe sidecar; cost £127; done 400 miles, same as new; £118, west; Co. Durham.—Box 1,160, c/o *The Motor Cycle*. [X4336]

**HARLEY-DAVIDSONS** in stock, 1915 T.T. solo, 1915 and 1916 standard combinations, 1915, 1916, 917 dynamo lighting combinations; details free.—Rider Troward and Co., 31 and 78, High St., Hampstead. [7068]

**HARLEY-DAVIDSON**, electric dynamo, 1915, bought 1916, Swan coach sidecar, with screen, hood, spare tyre and tube, all in first-class condition; owner joining up; £70.—Palladium, Mile End. Phone: East 233. [6947]

**HARLEY** Combination, 1915½, very little used, both mechanical and general condition absolutely as new, vries unsratched, fully equipped, very handsome outfit; 80 gns., or near offer.—Webb, Belmont, Surrey. Phone: Sutton 178. [7040]

**HARLEY-DAVIDSON** 1915 Combination, electric model, 7-9h.p., 3 speeds, Stewart horn, speedometer, ew tyre and accumulator, mileage 7,000, coachbuilt lancelet sidecar, with wind screen, luggage carrier, apron, and electric lamp, in perfect running order; £60-2, Vincent Rd., Norwich. [7198]

**HARLEY-DAVIDSON**, 1917, electric model, and H.D. best sidecar, 3 months old, price on application; also 1915 electric model and sidecar, £72/10; also 916 electric model and their E. sidecar, price on application.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [7244]

**HARLEY**, 1916 racing model, 7-9h.p., single-speed, clutch, racing exhaust pipes, rubber covered footboards, T.T. handlebars, Goodyear tyres, finished in Harley grey; this machine is an ideal sporting mount, and has had very little use; £63/10; extended payments on exchange.—Service Co., 292, High Holborn, London. [X4149]

## Hazlewood.

**1915** 5-6h.p. Twin Hazlewood Combination, 3 speeds, combined belt and chain kick start; £58/10.—Motor Exchange, Horton St., Halifax. [7048]

**HAZLEWOOD** 1915 Combination, 5-6h.p. J.A.P. engine, 3-speed, clutch, and kick starter, Lucas lamps, speedometer, special sidecar; £72/10; extended payments on exchange.—Service Co., 292, High Holborn, London. [X4146]



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8 h.p. MATCHLESS Combination, W.O. Model, new .....	£120 0
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1913 DOUGLAS, 2-speed, accessories ..	£32 10
1917 2½ h.p. CALTHORPE - J.A.P., Enfield gear, new .....	£39 18
1917 2½ h.p. EXCELSIOR-J.A.P., 2-sp., and clutch, new .....	£48 0
1917 2½ h.p. EXCELSIOR, 2-stroke, 2-sp., and clutch, new .....	£44 2
1917 2½ h.p. ALLON, 2-stroke, 2-speed, and clutch, new, cancelled order; cost £49 10s. ....	£44 10
1915 2½ h.p. HOBART-VILLIERS, 2-str., 2-speed .....	£27 10

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SCOTT, 1914, 3½ h.p., 2-speed, kick-start, complete minus Sidecar body .....	£40
INDIAN, 1916, 7-9 h.p., Powerplus, electric lighting, Indian coachbuilt Sidecar ..	£90
EXCELSIOR, 1915, 7-9 h.p., 2-speed, and Sidecar .....	£45
TRIUMPH, 1912, 3½ h.p., 2-speed, wicker Sidecar; slight repairs required ....	£27

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A.C., 1915, 10 h.p., dynamo, excellent order, £20 worth accessories; like new ..	£215
MORGAN, 1916, Grand Prix, water-cooled, disc wheels, finished red, excellent condition .....	£120
NAPIER, 1913, 15 h.p. Landaulette, splendid order. Any trial .....	£225

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## MOTOR CYCLES FOR SALE.

## Henderson.

**BEAUTIFUL** Henderson Combination, late 1915, splendid condition; £70.—Baets, 6, Camborne Terrace, Richmond. [7138]

**NEW** 10h.p. 4-cyl. Henderson, with Swan de Luxe coachbuilt sidecar, a very luxurious outfit, believed to be the last machine of its kind in the country, will run 45 m.p.g. on paraffin; solo machine considered in part exchange.—Oram, Colin Park, The Hyde, N.W.9. [6865]

## Humber.

**1914-15** Water-cooled Humber, 3½h.p., 3-speed, clutch; £35.—Below.

**1912** Humber and Coachbuilt Sidecar, 3½h.p., 2-speed, hood, screen, fully equipped, excellent condition; £42/10.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0593]

**HUMBER** Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

**2-h.p.** Humber Lightweight, just overhauled; £14/14; approval.—10, Norwood Crescent, Southport. [X4305]

**1914** 3½h.p. 3-speed Humber, lamp, etc.; £35, cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863]

**HUMBER**, 1912, 3½h.p., 2 speeds, spring forks, in good condition; £24.—Motor Exchange, Horton St., Halifax. [7049]

**1915** 2½h.p. Humber, twin-cyl., hub 3-speed gear, clutch, lamps, etc., new tyres, Cowey speedometer; price £35.—F. W. Hunt, Church St., Whitechurch, Hants. [6984]

**HUMBER**, 3½h.p., 1911, 2 speeds and clutch, and sidecar; £30; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7007]

**HUMBER**, 3½h.p., 1914, 3 speeds and clutch, lamps, horn, and sidecar; £38; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7008]

**LATE** 1914 4½h.p. Humber, and Millford sidecar, 3-speed, water-cooled, kick starter, and lamps, luggage grid, new condition; £50.—Bedford, 42, Pine Rd., Criklewood, N.W.2. [7039]

**HUMBER** 3½h.p. Flat Twin and Canoelet Minor sidecar, only done thousand miles, 12 months' insurance policy included; £82, no offers.—Gillett, 135, Walsgrave Rd., Coventry. [X4501]

**1914** Humber, 4h.p., water-cooled, 3-speed Sturmer-Archer gear, clutch, heavy coach sidecar, good make hood, glass wind screen, spares, lamp, luggage carrier; any trial 50 miles; good as new; £52/10.—Humphreys, 185, Brighton Rd., South Croydon. [X4357]

## Indian.

**1912** 4h.p. Blue Indian, 2 speeds, free engine; £22/10.—Motor Exchange, Horton St., Halifax. [7050]

**INDIAN** 1915 Combination, 7-9h.p., grand turnout; £62/10.—51, Mapletorpe Rd., Thornton Heath, S.E. [7149]

**INDIAN** 9h.p. Twin and sidecar, very powerful; 40 gns.; appointment.—66, Greyhound Lane, Streatham. [7152]

**7-9h.p.** T.T. Indian Powerplus, 3-speed, clutch, very powerful and fast machine: 58 gns.—Sellers, Motor Cycle Specialist, Dorchester. [7271]

**INDIAN**, 1916, 6h.p., 3-speed, kick start, clutch, in perfect running order and good condition; £4/10.—W. Crumplin, Odham, Hants. [7123]

**7-9h.p.** Indian, 1912, clutch model, good condition, £26; 5-6h.p. Indian, 1911, fixed engine, used two seasons, £20.—80, Bisham Rd., Southport. [X4306]

**LATE** 1915 5h.p. Indian, 3 speeds, clutch, and smart Phenix coachbuilt sidecar, original tyres; on offer.—F. Petersen, London Hospital, Whitechapel, E. [7272]

**1914** Indian Combination, 7-9h.p., 2-speed, clutch, spring frame, electric model; £45.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552]

**INDIAN** 1914 Combination, 2-speed, clutch, kick start, electric horn and head lamp, not done 4,000 miles; £60.—Hart, 12, Devonshire Rd., Forest Hill, S.E.25. [X4432]

**1914** 7-9h.p. T.T. Indian, with aluminium sidecar, disc wheel, electric horn, 3 lamps, splendid condition; owner going abroad; 38 gns.—Mitchell, Grosvenor House, Lymington. [X4392]

**7-9h.p.** Spring Frame Indian, 1914, 2-speed, and clutch, tip-top order and condition, very fast and powerful; £43 cash, bargain; sidecar to match, £4.—Cook, 66, Richmond Rd., Lincoln. [7045]

**INDIAN** 1914 Combination, 2-speed, spring frame, electric lamps and horn, hood, in splendid condition, only been used week-ends, seen by appointment after 6.30 evenings; 50 gns.—10, Mount Ar., Chippingford. [7032]

**7-9h.p.** Indian and coachbuilt sidecar, new condition; owner joined up 2 years since; 2-speed, clutch, kick start, horn, lamps, tools, spare Rom studded tyre, tools, etc.; sacrifice, £65.—Box 1,171, c/o *The Motor Cycle*. [X4492]

**INDIAN**, 1914 (December), 7-9h.p., 2-speed, clutch, electric horn, head and rear lamps, splendid condition, speedometer, less than 1,000 miles; too fast for owner; price £45, or exchange for good condition Douglas.—Mrs. Simpson, 170, Fairhazel Gardens, W. Hampstead. [7098]



## MOTOR CYCLES FOR SALE.

## Indian.

3 1/2 h.p. Indian Twin, 3-speed, clutch, and kick starter, in splendid condition, and complete with lamps and mechanical horn, tyres as new; £48; would exchange with cash adjustment either way for good combination, or sporting countershaft single.—Box L4,358, c/o The Motor Cycle. [7062]

INDIANS.—1916 Powerplus combination, sporting coach sidcar, disc wheel, as new, 78 gns.; 1915 T.T., 7-9 h.p., clutch, 39 gns.; 1916 2-stroke Indian, 3-speed, clutch, kick start, as new, 37 gns.; 1914 7-9 h.p. Indian, 2-speed, clutch, kick start, 35 gns.—Rider Troward's, 31 and 78, High St., Hampstead. (D) [7072]

INDIAN, 7-9 h.p., with Swan c.b. sidcar, 1913 spring frame, kick start, new 2-speed gear and foot clutch, triple wind screen and hood (both new), Stewart speedometer, horn, pump, lamps, and spare inner tube, extra seat in sidcar for child, luggage carrier, smart turn-out, in good running order, tyres excellent; £60; seen by appointment only.—S.W.G., 8, Ardwick Rd., N.W.2. [7204]

## Ivy.

IVY, 2-stroke, 2 1/2 h.p., 1915, good tyres, fully equipped, as new throughout; £25.—Advertiser, 156, Gt. Portland St., W.1. [5924]

IVY 2-stroke, 2-speed countershaft gear, late 1916, absolutely as new, specially fitted for paraffin, practically unused; £32.—Axon, 134, Bath St., Rugby. [6982]

## James.

JAMES 2-stroke, 2-speed, 1917, scarcely used; £30.—Smith, 45, Montpelier Rd., Keatish Town. [7087]

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803]

JAMES, 2-stroke, 2-speed, Lucas lamps and horn, leg guards, absolutely as new; £40.—Neale, Littlecote, Solihull. [X4426]

JAMES, 4 1/2 h.p., 1913 model, with 3-speed gear, foot clutch, good condition; £26.—Egles and Co., High St., Acton, W.3. [X4450]

JAMES, 2 1/2 h.p., 1915, 2-stroke, 2 speeds; £31; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [6987]

JAMES, 2 1/2 h.p., 1916, 2-stroke, 2 speeds, lamps, and horn; £36; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [6988]

1913 James Combination, waterproof Bosch, chain drive, countershaft 2-speed gear, coach-built body; £56/10.—Motor Exchange, Horton St., Halifax. [7051]

4 1/2 h.p. James and Sidcar (1916), only done 500 miles, 41 splendid condition, lamps, Klaxon horn, tools, etc.; £65.—Harvey, 25, Westbourne Rd., Walsall. [X4500]

1917 James, 4 1/2 h.p., solo, 3-speed, kick starter, run 100 miles; £55; purchased July. Phone: Avenue 2900.—14, Spital Sq., Bishopsgate, E.1. [7279]

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—1917 James de Luxe combination, Lucas dynamo lighting; cost £103; run 1,000 miles, 79 gns. (D) [7075]

JAMES 1914 3 1/2 h.p. Twin, T.T., 3-speed, clutch, kick starter, very fast, wonderful climber, good condition, all accessories; £53.—Brown, St. Martin's House, Hereford. [X4494]

JAMES, 1914, 4 1/2 h.p., 3-speed countershaft gear and clutch, mechanical condition sound, with sporting coachbuilt sidcar; £42.—Pay, Wheatash Rd., Addlestone. [7159]

JAMES, 2 1/2 h.p., 2-stroke, 2 speeds, 1915-16 model, very little wear, accessories, will run on half paraffin; £29, or nearest.—Ward, 7, Herndon Rd., Wandsworth. [7150]

JAMES 4 1/2 h.p. 1914 Combination (coachbuilt), 3-speed countershaft gear, speedometer, and horn; £44; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [6986]

JAMES Combination, late 1916, 4 1/2 h.p., 3-speed, all chain drive, only ridden 500 miles, all accessories, including two new lamps; a great bargain, £65.—Woodward, 25, Silvertown Rd., Fulham Palace Rd., Hammer-smith, London. [X4308]

1917 3 1/2 h.p. Twin James, 3-speed, and hand clutch, lamps and horn, mileage only 1,200, in perfect order throughout, and running like clockwork; £60, or near offer; cost £72; owner going abroad; could probably arrange ride 50 miles see bona fide purchaser.—Smith, Rackenford Lodge, Weybridge. [7013]

## J.A.P.

4 h.p. 1916 J.A.P., 2-speed, Kick starter, all chain, sidcar; £45.—Digby, Mersea, Essex. [7109]

4 h.p. J.A.P. and Sidcar, N.S.U. gear, Dunlops, splendid condition; £26/10.—Laughlin, 213, Rye Lane, Peckham. [6946]

## J.H.

J.H., 2-speed, new; £35/14; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4152]

J.H., 1917, new, 2 1/2 h.p., 2-speed, 2-stroke; 42 gns.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7192]

LATE 1916 J.H., 2-stroke Villiers, absolutely perfect, and new condition, full T.T., spare belt, silencer, etc.; cheap, £20.—Jeannings, 9, Meadow, Gidea Park, Romford. [7267]

SELECTION FROM 150 MACHINES IN STOCK :  
New 1917 Models.

ALLDAYS ALLEN, 2-speed, 2-stroke	40 gns.
COVENTRY EAGLE, 2-speed, 2-stroke	40 gns.
JAMES, 2-speed, 2-stroke	40 gns.
JAMES, 3 1/2 h.p. twin, 3-speed	£69 10
JAMES, 4 1/2 h.p. single, 3-speed	£69 10
NEW IMPERIAL, J.A.P., 2-speed	40 gns.
ROVER, 3 1/2 h.p., T.T., Philipson	—
ROVER, 3 1/2 h.p., 3-speed	—
ROYAL RUBY, 4 h.p. J.A.P., Sturmer	69 gns.

## Second-hand Combinations.

BOUNDS J.A.P., 1915, 8 h.p., 3-speed, coachbuilt	59 gns.
B.S.A., 1916, chain-drive, coachbuilt	62 gns.
DOUGLAS, 4 h.p., 3-sp., clutch, kick-start, coachbuilt	59 gns.
ENFIELD, 1917, de Luxe Combination, Lucas dynamo lighting, hood, screen, luggage grid; cost £120	92 gns.
EXCELSIOR (American), 1915, de Luxe coachbuilt Combination, 7-9 h.p., 3-sp., dynamo lighting, speedometer, etc.	69 gns.
HARLEY-DAVIDSON, 1915, standard 7-9 h.p. Combination	65 gns.
HARLEY-DAVIDSON, 1915, dynamo lighting, 7-9 h.p. Combination	69 gns.
HARLEY-DAVIDSON, 1916, standard Com.	82 gns.
HARLEY-DAVIDSON, 1916, dynamo lighting Combination	86 gns.
HARLEY-DAVIDSON, 1917, dynamo lighting Combination	119 gns.
INDIAN, 1915, 7-9 h.p. coachbuilt Comb.	45 gns.
INDIAN, 1916, Powerplus sporting Com.	78 gns.
JAMES, 1917, de Luxe coachbuilt Combination, Lucas dynamo lighting, electric horn, as new; cost £103	79 gns.
PREMIER, 1914, 3 1/2 h.p., 3-speed, coach Sidcar	37 gns.
PREMIER, 1915, 7-9 h.p., 3-speed, countershaft, 30 gns.; Sidcar	45 gns.
SCOTT, 1915, coach Combination, as new	55 gns.
TRIUMPH, 1914, 4 h.p., 3-speed, 1916 coach Sidcar	48 gns.

## Solo Mounts.

ALLEN, 1916, 2-speed	27 gns.
BROUGH, 1916, 3 1/2 h.p. twin, 3-speed, Sturmer countershaft	59 gns.
B.S.A., 1913, T.T., 2-speed, clutch	27 gns.
CALCOT, 1914, 2 1/2 h.p., 3-speed, clutch	22 gns.
CALTHORPE, 1915, 2 1/2 h.p. J.A.P., Enfield gears	24 gns.
DOUGLAS, 1913, T.T., 2-speed	29 gns.
DOUGLAS, 1914, T.T., 2-speed	34 gns.
ENFIELD, 1916, 2-speed, 2-stroke	27 gns.
HARLEY-DAVIDSON, 1915, T.T., 7-9 h.p., 3-speed	54 gns.
HUMBER, 1913, 3 1/2 h.p., 2-speed	22 gns.
IVY, 1915, 2-speed, 2-stroke	24 gns.
INDIAN, 1914, 7-9 h.p., 2-speed, clutch, kick-start	35 gns.
INDIAN, 1915, T.T., 7-9 h.p., clutch	39 gns.
JAMES, 1914, 4 1/2 h.p., 3-speed, clutch, k/s	39 gns.
LEVIS, 1916, as new	24 gns.
METRO, 1916, 2-stroke, sloping tank	22 gns.
NEW HUDSON, 1914, 2 1/2 h.p., 3-sp., clutch, kick-start	25 gns.
NORTON, 1914, T.T., Philipson	29 gns.
NORTON, 1915, T.T., Philipson	32 gns.
O.K.-JUNIOR, 1915, 2-speed	17 gns.
O.K.-J.A.P., 1916, 2-speed	23 gns.
RADCO, 1916, 2-stroke	22 gns.
RUDGE, 1912, 3 1/2 h.p., 2-speed, clutch	17 gns.
RUDGE-MULTI, 1913	24 gns.
RUDGE-MULTI, 1914, T.T. model	27 gns.
RUDGE-MULTI, 1917, as new	49 gns.

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## Kerry.

KERRY, 2 1/2 h.p., spring forks, less mag.; £4/10. 816, Harrow Rd., London. [720]

## Lagonda.

4 h.p. Lagonda, free engine, Bosch mag., Amac ca buretter, spring forks; bargain, £16/10.—91, Kings Rd., Peckham. [704]

## Levis.

LEVIS, used 3 weeks only; £26; full equipment.—65 Rosendale Rd., Dulwich. [727]

2 1/2 h.p. Levis, practically new, full accessories; £19/10 lowest.—Morgan, 60, Kingscourt Rd., Streatham [703]

COLMORE Depots, Birmingham and Leicester, delivery of all models of Levis motor cycles from stock. [080]

LEVIS, 2 1/2 h.p., 1915, 2-stroke, head lamp, generator rear lamp, good tyres, fully equipped; bargain, £2.—Advertiser, 156, Gt. Portland St., W. [660]

LEVIS, late 1915, 2 1/2 h.p., new tyres, lamps, horn tools, etc., condition as new; £22. Smith, 11 Haverstock Hill, opposite Chalk Farm Tube Station. [720]

LEVIS Model E, 2-speed, 2 1/2 h.p., £47/10; also Poplar model at £32; also 1914 Baby model, 2 1/2 h.p. at £23/10.—Lamb's, 151, High St., Walthamstow, or 50, High Rd., Wood Green, N. [724]

LEVIS 2 1/2 h.p. Popular Lightweight, 2-speed, chain and belt drive, rubber studded tyres, brand new in stock for immediate delivery; reduced price, £44. Mebes and Mebes, 156, Gt. Portland St., W.1. [692]

## Lincoln-Elk.

RIDER TROWARD'S, 31 and 78, High St., Hampstead.—Lincoln-Elk, 1913, 3 1/2 h.p., variable gear waterproof Bosch, in good order; 19 gns. (D) [708]

LINCOLN-ELK 3 1/2 h.p. Motor Cycle and sidcar, Bosch, 2-speed, F.E., handle starting in perfect condition; £18, or near offer.—19, Nigel Rd., Peckham [712]

## Martin.

4 1/2 h.p. Martin-Jap Racing Model, o.v.; £32; exchnge for touring model.—Pemb-Rhos, The Common Weybridge. [X446]

## Matchless.

MATCHLESS Motor Cycles; no quicker delivery of reliable than from Colmore Depots. [088]

MATCHLESS 8 h.p. Combination, 2 speeds, good condition; £40.—Coombs, Gunter Garage, Gunter Grove, Chelsea. [714]

MATCHLESS, 1917, 8 h.p., war model combination spare wheel.—A. H. Price, Mount Pleasant Bradford-on-Avon. [717]

MATCHLESS 1915, 8 h.p. Twin J.A.P., 2-speed combination, new sidecar, Jones speedometer, P. and H. lamp and rear; £70.—B. S. Roy, Barnham Marks Norfolk. [X438]

MATCHLESS, late 1915, 7 h.p. M.A.G. coachbuilt sidcar, just repainted black and gold line, as M. Sunbeam, all accessories; £85.—Cass's Motor Mart, Warren St., Euston Rd., W.1. Museum 623. [582]

MATCHLESS-J.A.P. 8 h.p. 1914 Combination, 2 speeds, free engine, kick start, fitted for colt stitute, very fast and powerful, recently overhauled £42, no offers.—65, Ford Rd., Catford, S.E.6. [715]

MATCHLESS Combination, 1915, M.A.G. engine, 2 speed, kick start, hood, screen, 3 lamps, luggage carrier, perfect order; price 70 gns.; seen evenings 6 o'clock.—254, Gt. College St., Camden Town, N.W. [713]

MATCHLESS 1917 Combination, 8 h.p., 3-speed clutch, and kick starter, detachable wheels, including spare wheel, new; £120; extended payments or exchange.—Service Co., 292, High Holborn, London. [X415]

1913 Matchless-Jap, 4 h.p., 2 speeds and free engine Bosch waterproof, drip feed, all accessories, gallons petrol; £23, or exchange for modern combination and cash adjustment.—B. Sharman, 52, Pepys Rd., New Cross, S.E.14. [703]

MATCHLESS, 1915, 7 h.p. M.A.G. engine, 3-speed hood, wind screen, speedometer, lamps, and horn £89/10; also 1914 8 h.p. J.A.P. model, just in, price on application.—Lamb's, 151, High St., Walthamstow, or 50, High Rd., Wood Green, N. [724]

MATCHLESS, 7-9 h.p., 3-speed countershaft gear clutch, and kick starter, complete with two £3/18; F.R.S. lamp sets, electric horn and rear light, speedometer, trip record, new back and front tyres, only used Sundays, smartest lot on the road; £70.—Cox, 7, Chilton Hill, New Cross, S.E.14. [712]

## Minerva.

1 1/2 h.p. Minerva, just enamelled, replated, new 26x2 1/2 tyre, new lamp, guaranteed; £9/9.—1 Norwood Crescent, Southport. [X430]

## Motococche.

MOTOSACOCHE, fitted with mag., in fine running order; £10.—Merrick's Stores, 174, Listerhill Rd. Bradford. [701]

## New Hudson.

1913 New Hudson, 3 1/2 h.p., 3-speed, clutch, lamp horn, etc.; great bargain, £27.—Trutt, Fen View, Skewen. [X442]





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### The Motor Cyclist Mechanic.

**I**T is not for a moment suggested that the average modern motor cycle needs an engineer to keep it in running order (in fact, we shall shortly show that the reverse is the case), but it is most essential that the motor cycle rider should have a thorough knowledge of his machine and be capable of doing all running repairs. A good many motor cyclists are handy men and eventually become fairly skilful in the use of tools—a most desirable accomplishment. But it is true—how true we only learned comparatively recently—that many motor cyclists cover thousands of miles with practically no mechanical knowledge at all. The machine takes its owner out and home again with monotonous regularity, and when it ceases to pull well, or fails to run at all, it is taken to the garage, put in order, its owner cheerfully pays the bill and continues his happy-go-lucky career.

That numerous such riders exist was forcibly brought to our notice when the staff of *The Motor Cycle* examined recruits for the technical branches of the Army. Such people could not answer the simplest questions concerning the working of their machines, even though they had been riding two or three years. At the present time more than ever the motor cyclist should be capable of doing all he can for himself. He should read and study all the excellent handbooks on the subject, fit up his shed as a workshop, and by dint of the book and practice learn the art of valve grinding, filing, soldering, and riveting, so that he may be independent of the local man, who, nowadays, if he is in a small way, is short staffed; or, if in a large way, is busy with munition work. To rig up a motor cycle shed as a workshop is not necessarily an expensive matter, and the tools required need not be numerous, but it is most desirable that the place should be well lighted.

In spite of the reliability of the modern machine, some time or other trouble is bound to occur, and so it is wise to have everything requisite

to getting on the move again—not only the necessary tools and spares, but the knowledge to use them, and this is only acquired by the man who thoroughly understands his machine.

Motor cycle riding is a healthful pastime in more senses than one, as it not only stimulates and benefits the body, but it exercises the brain by bringing out skill in manipulation and in teaching the owner how to use his hands.

### The Best Metal for Cylinders.

**A** MOST interesting and important subject was discussed in *The Autocar* nearly a month ago, viz., the effect that the material used in the construction of cylinders has upon engine friction. It has been pointed out in our columns on previous occasions—to wit, by Mr. J. L. Norton, on January 11th of this year—that the friction, which takes place between the piston rings and the cylinder walls, accounts for the greatest frictional loss in an engine; moreover, static friction, which is far more serious than the friction between moving bodies, comes into force at each end of every stroke. This being the case, every improvement in the working surface of the cylinder must be of the greatest value.

It is pointed out, with truth, that it is not so much the surface which may be put on a highly finished engine, though naturally that should be as perfect as it is possible to make it, as the surface which the cylinder takes in use. It is well-known that many cylinders after use have a highly polished glass-like interior; this, of course, means a minimum of friction, while others attain a condition far less perfect. Obviously, these differences must be due to the varying qualities and composition of the cylinder metals.

We should much like to see experiments carried out with cast iron of different quality and composition, as well as with steel and aluminium, with a view to finding the most suitable materials for this important purpose.



# IDEAS: Useful and Ingenious.

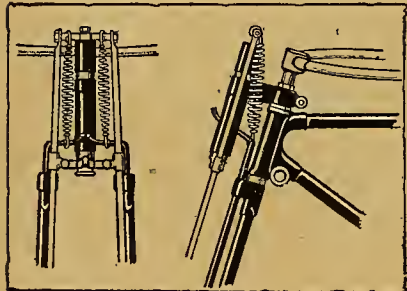
Sydney R. Jones



## A TIP FOR P. & M. RIDERS.

THE sketch shows a rather useful and simple tip for P. and M. owners. I was riding recently in one of the R.F.C. sidecars, and noticed that the spring forks were fitted with two extra Terry springs hooked on, one on each side in the manner shown. I asked the driver whether they were advantageous, and he assured me that they were a very great improvement, adding materially to the comfort of the machine, and entirely preventing the forks from "clashing," which they are rather apt to do on these appalling roads. I thought perhaps any of your readers who happen to be P. and M. riders might care to try this tip, because the springs are so cheap and easily fitted, and also look exceedingly neat. I must apologise if the drawing is inaccurate, as it is almost entirely done from memory.

I was never a P. and M. owner myself, though I have owned fifteen different machines; in fact, I have only actually ridden a P. and M. on two occasions, but I must take this opportunity of expressing my admiration of the way in which this make of machine stands up



A useful idea for riders of motor cycles, on very rough roads, is the fitting of two extra springs on the forks.

to the rough work out here; and every one of the despatch riders whom I have questioned on the merits of the machine has had nothing but praise for it. I suppose I must add to this the usual disclaimer.—W. A. N. SMITH, Lt. (B.E.F.).

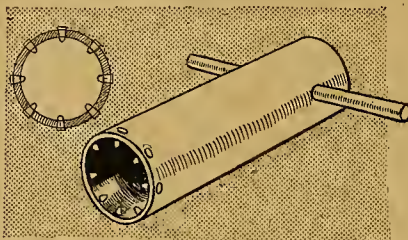
## A TOOL FOR REMOVING A TIMING PINION.

MANY owners of J.A.P.-engined motor cycles find it necessary at some time or other to remove the small timing pinion from the engine shaft, and a hint or two as to how this may be done will undoubtedly be of interest to them.

The pinion is secured to the shaft by being screwed on with a left-hand thread, and to facilitate its removal a

special tool is required. As, owing to the Prohibition Order, this tool cannot be purchased, an excellent substitute may be made in the following manner: A steel tube, almost the size of the

pinion, should be obtained, and in one end of it a tommy bar should be inserted so that it is a driving fit. Next, a number of steel pegs should be inserted at intervals round the tube and brazed or screwed into position, corresponding with the gaps between the teeth, and if sufficient force is exerted the wheel may be removed without fear of damage. Attempting to hammer it off with the aid of a brass punch may result in the teeth being chipped or broken.

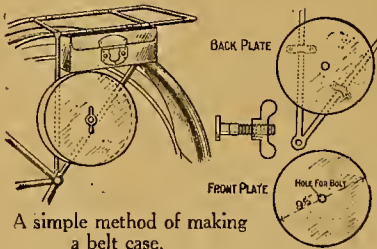


A tool for removing a timing pinion.

pinion, should be obtained, and in one end of it a tommy bar should be inserted so that it is a driving fit. Next, a number of steel pegs should be inserted at intervals round the tube and brazed or screwed into position, corresponding with the gaps between the teeth, and if sufficient force is exerted the wheel may be removed without fear of damage. Attempting to hammer it off with the aid of a brass punch may result in the teeth being chipped or broken.

## HOW TO CARRY A BELT.

I AM sending an idea which may be useful to D.R.'s generally. It is a device for carrying the spare belt, and has been used by our Divisional Section for a long time. The spare belt is generally hung in any old place, sometimes coiled round the tank or fastened to the carrier by bits of wire, seldom looking a tidy or workmanlike job. The sketch, I think, explains all that is

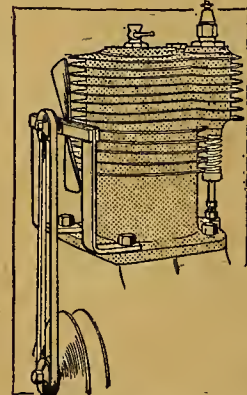


A simple method of making a belt case.

required. The discs are cut from oil drums, preferably using the bottom plate, which is of a stout gauge. "Black box" clips fasten the back plate to the carrier stays. The centre bolt and wing nut can usually be obtained from the "Column," or perhaps the Q.M.S. may stock them for the Barrow drum universal. If a "posh" effect is desired a thick brass wire may be sweated to the edge of the top plate or a strip soldered on the underside to enclose the belt entirely. The belt should be coiled and wired before placing in the holder.—SOUJIER D'OR.

## A COOLING FAN.

A GOOD deal has been written about internal cooling of the engine; but why not try external cooling, as we have done? An 8in. fan was fixed on the left-hand side of the engine, fastened on by the two nuts that hold the cylinder down. Its power is conveyed from a pulley fixed on to the flange of the engine pulley to another fitted on the bracket as shown in the drawing. A half-inch



leather belt suffices to put this 8in. fan at about 2,000 revolutions per minute, according to how fast the engine is travelling. I have found the device to be very efficient in cooling the engine, and by it the power is retained. Recently I gave this idea a severe test by going on a tour of 18 miles into the heart of Wales.

A simple method of fixing a fan to assist cooling the engine.

It gave every satisfaction, taking some hills on top gear that I should have had to change down on had I not had the little fan. My machine is a 3½ h.p. two-speed Humber, and the device has cured my greatest trouble—knocking on hills. It is quite compact, is unobtrusive, and a unquestioned boon.—H. J. WAKEFIELD Birmingham.

## TO SECURE SCREWS.

THE set pins holding the rear wheel stands of many machines are a source of constant irritation through coming unscrewed. This can be remedied by seccotining the thread, taking care to keep the seccotine from the cone washer and set pin head.—L. QUINTON.



# Occasional Comments by "Ixion"

## An Experiment.

IF I had time, money, and the necessary resources, I should like to build a single experimental engine. Steps would first be taken to equalise its front and rear cooling as far as possible. Then the best metals and the best constructional system would be employed to radiate away as much of the waste heat as possible. It might have, for example, an aluminium alloy piston; a steel cylinder barrel, machined to a dead even thickness throughout; copper fins secured round the steel barrel; possibly a cast aluminium combustion head, with seatings for the overhead valves embodied in the casting. I should expect such an engine to prove itself an astonishingly good hill-climber on a normal top gear ratio; to carbonise very, very slowly; to be almost konkproof; and to register a gratifying petrol consumption.

## Commercialising the New Type.

THE expense of such an engine might prove prohibitive when it came to manufacture. I am an utter ignoramus at costing, but I fancy I have heard that aluminium now costs about £225 per ton, and copper is not exactly cheap. Granville Bradshaw managed to sell his twin, with cylinders machined from the solid steel ingot, at £63 before the war, and presumably the waste metal cost him little more than the combined cost of dud iron castings and more complex machining jobs cost a more orthodox designer. Still, where there's a will there's a way, and I shall never believe that the discoveries in respect of air-cooling which aviation has brought us will not be reflected pretty accurately in post-war motor cycle practice. The A.B.C., for example, in pre-war days struck one as a lovely job, until one took its engine down and handled the great clumsy cast iron cylinder heads. They did not strike us as clumsy then, for they were probably as good as anything in that line which the world's foundries had turned out in those days; but when you have seen a section of the cylinder head of the latest 260 h.p. Mercedes, 1914 cast iron work seems a wash-out: and some of our own modern engines, not to speak of those of France, can give that Merc. head a long start.

## Heat Distortions.

RESEARCH in connection with air-cooled aero engines during the war has proved that large air-cooled cylinders of cast iron distort very badly in the air, and one wonders how far this justifies the deduction that small air-cooled cylinders of cast iron distort very badly on the road or the track. The circumstances under which the two types of engine work are not, of course, strictly parallel. The aero engine is perpetually working at full throttle, or very near it; the motor cycle engine is throttled down to about half its power output for most of its working life. The aero engine has a cooling draught of about 80-120 m.p.h. velocity on its front, and nothing in the way of a breeze on its stern, unless special cowling is arranged

for it. The motor cycle engine receives a 30 m.p.h. draught on its face and no breeze at all on its rear, except what gets round the corner. Nevertheless, a little consideration suggests that the motor cycle engine of pre-war type suffers quite appreciably from distortion, even though its fore and aft temperatures may not show quite such a divergency as those of an aero engine.

## Primitive Aero Engines.

THE early air-cooled aero engines distorted so badly that they had no compression left worth mentioning after a short spell of hard work. They glowed like red hot coals when dusk came on. They burnt out valves galore. Their petrol consumption was truly frightful, seeing that compression leaks admitted air and produced such a slow-burning mixture that a large proportion of the charge could get no real resistance to push against; that the compression stroke became in part an exhaust stroke, thrusting unburnt gas out through undesired apertures and clearances; and they mopped up oil incredibly, as they relied on it so much for cooling.

## How they were Improved.

DISTORTION was gradually brought under control, if not wholly eliminated, by a variety of dodges. Peculiar piston rings were employed to follow up distortion. The contrast between a 100 m.p.h. blast on the engine's face and a zero blast on the back of its neck was evened up by cowling. Less expansive metals were employed for the cylinders. More radiative metals came into vogue for the piston. Novel constructional methods arose for eliminating all the blobs of thick metal which used to disport themselves here and there in the engine and render even expansion impossible. So to-day we can construct colossal air-cooled cylinders, which are just about as compression tight at the end of a three hours' flight as they were when they left the hands of a first-class factory or squadron tester.

## What about the Motor Cycle Engine?

I SHOULD say that most thoughtful motor cyclists are quite convinced that distortion is at the bottom of konking, though they may not be able to work out the details. We all notice that when we get our engines really hot, either after prolonged hill work with a sidecar or scrapping solo on low gear, or after illegal and sustained speed on the flat, our engines are uncommonly easy to turn over; there is precious little resistance to the upstroke of the piston, and in extreme cases you can easily push off without lifting the exhaust valve. Indeed, I know some riders who say that those konks which are accompanied by heat are due to a slow burning mixture taking up all the engine clearances rather deliberately, and that you can "run off" the konk if only you can get speed up, simply because the weaker mixture suits the faster speed. Anyhow, it will be interesting to see how experimental engines made on aero principles behave.



## A WAR-TIME OVERHAUL.

Many machines being laid up on account of petrol shortage, a few hints on the matter of effecting a thorough overhaul will be acceptable.

**E**ARLY this year I became painfully aware that my sidecar combination had lost its pristine vim, and the sarcastic remarks of some supposed friends as to its appearance strengthened my determination to have it thoroughly overhauled at the earliest opportunity. It was, however, quite another matter to get that determination carried into effect. The makers could not undertake the work, and all firms of repute being engaged with Government or controlled work, the only alternative was to tackle the job myself. This sounded very nice until a list of the various requirements and operations to be undertaken were carefully drawn up and examined; then the magnitude of the task, to one who has no workshop available, was realised (especially as there is no motor shed attached to my residence, and the combination has to be garaged about a quarter of a mile away). I had intended to do the work during the winter and early spring, but it was postponed time after time, as the prospect of working in an Arctic atmosphere was not alluring, and the shed at my disposal was not heated. A rough idea of the work in contemplation will not be out of place.

**Machine.**—A thorough overhaul; the frame to be enamelled and a few parts plated.

**Engine.**—Owing to one of the flywheels having worked slightly loose, and the machine having been run for some distance in that condition, the taper hole through which the crank pin passes had become slightly oval. Thus it was impossible to lock up the flywheel dead true, and it was decided to have it rebored and a special crank pin made and fitted. The machine having covered over 25,000 miles, the cylinders had worn oval, and new ones had to be obtained. The lapping out of old cylinders and fitting new pistons—which, of course, would not be standard size—was thought of, but in working out the cost the difference was so slight that the former course was decided on. The other repairs that might be necessary could not be ascertained until all was dismantled, cleaned, and a thorough examination made.

With regard to the sidecar, the renovation of this was to be of a thorough order. The upholstery was worn out, the paintwork badly chipped and scratched, the framework rusted up, the hood and apron were

in holes and torn, and the framework of the hood broken.

The size of the shed was only 8ft. x 6ft. 6in.—just large enough to house the outfit comfortably, but very much too small when all was dismantled. It was decided to take off the sidecar body, leaving the work in connection with it to be done at the house, where a cupboard just large enough to take the body was available. I intended to do the main part of the work on the sidecar body on the lawn, when the weather was suitable.

Previous to dismantling, the available supply of tools had been taken to the garage and a temporary bench fitted up with a 4in. vice and a small bench drill. The accumulation of tools was fairly extensive, as for some years past I have been in the habit of doing all possible repairs myself, starting on this basis: I used to calculate roughly the cost of a certain repair; if I considered it possible to do that repair myself, provided I had the necessary implements, I spent the estimated cost of repairs on the tools, and after having done it, I had the tools for future use.

In this way I became possessed of a very useful set. These were all transferred from the house to the garage, together with two gallons of paraffin for cleaning purposes, plenty of old

rags, sandpaper, emery cloth, a number of small cardboard boxes and round tins for storing nuts, bolts, balls from bearings, and the many small parts. A box of odds and ends of nails and screw eyes on which to hang parts, etc., was useful for driving and screwing into the walls.

The preparation of the shed and collection of everything necessary took some time, but this was saved later by having any particular tool available when required.

Everything being ready, a start was made and the dismantling process proceeded.

One thing, it ought to be mentioned, must be obtained, and that is an efficient covering for one's clothes; otherwise the cost would be materially increased by having to purchase various new garments. Engineers' brown overalls give efficient protection, but it is advisable to change into an old suit, especially during the dismantling and cleaning process.



The small workshop in which the work was done. It measures only 8ft. x 6ft. 6in.



# A War-time Overhaul.—

The stripping is done in the usual way, all nuts, bolts, washers, and other small parts being placed in a tin (2 lb. golden syrup tin for preference) in which a few tiny holes have been punched in the bottom. This can be placed in the pail containing paraffin, and, after soaking, a good shake will remove all the oil and dirt, the paraffin draining out at the bottom. This is a very effective way of cleaning small parts. Afterwards these are dried with a cloth and put away in small boxes for the assembling period. If it is intended to have any replated, they should be sorted and strung on thin copper wire ready for the platers.

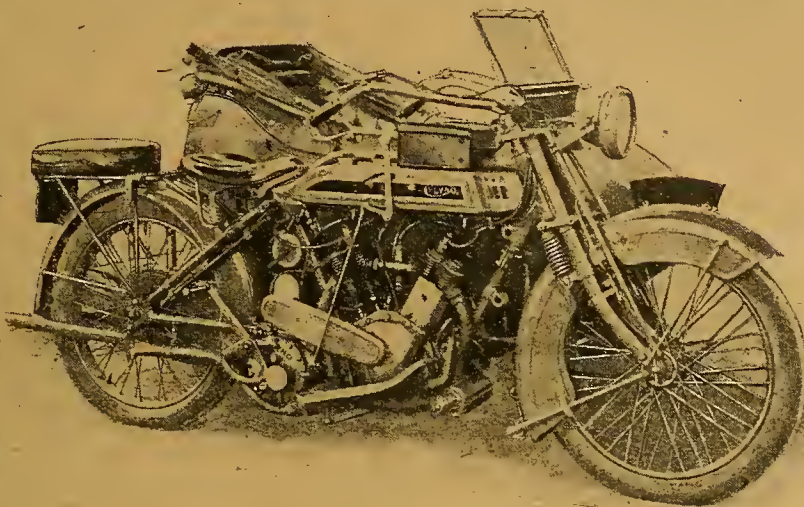
## Importance of Thorough Cleaning.

Too much attention cannot be given to the cleaning. Paraffin and stiff brushes of various shapes should be freely used. A most useful recent purchase was a brazing brush about 6in. x 1 1/4 in. wide; this had steel bristles, which removed all kinds of dirt, oil, and loose enamel in a very expeditious manner, and it cost only about a shilling.

The cleaning of the machine, when dismantled, with the careful and minute examination of the whole, took the writer just a fortnight. This, of course, means the spare time after six o'clock in the evening, Saturday afternoon, and one other whole day each week. It is only then that the necessary replacements can be ascertained, and the repairs to those that it is not intended to renew decided on.

Remembering the mileage this machine had done, the replacements necessary were less than anticipated. The cylinders, as already stated, were badly worn, and new ones were decided on in preference to lapping out and fitting new pistons. The disadvantage of the latter course would be that the pistons, gudgeon pins, and bushes would not be standard, and future replacements would have to be specially made. New gudgeon pins and bushes for the small ends of the connecting rods, a new crank pin and rollers for the big end, were found necessary. These were the total replacements for the engine, and the parts were ordered at once.

**Gear Box.**—A close and thorough examination revealed the interior to be in perfect condition, and the cover was replaced without disturbing anything.

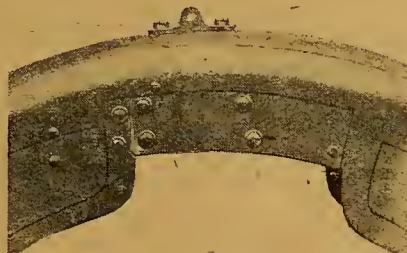


The Clyno outfit after being overhauled and re-enamelled.

**Gear Levers.**—The internal and external gear levers on the gear box are fitted together on a square, locked with a nut and split pin. The square portion had worn considerably owing, no doubt, to its being used when slack, with the result that there was now considerable play. This made it difficult to get the gears home, and sometimes they jumped out of their own accord. The thread of the bolt had stripped in the

effort to tighten the nut sufficiently to make it hold. First the square on the internal lever was filed up dead true, and the same done on the receiving portion of the external lever. The latter was now a slacker fit than before, probably 1/32 in. all round. To take up this slack it was decided to pack up the internal portion by soldering a strip of sheet steel all round. Firstly, a strip of steel the desired thickness

was cut and tinned with solder, the square portion of the lever being treated in the same manner. The strip was then shaped and put round the square, the other lever being driven into position with a hammer. An Imp blow-lamp was then put on until the solder was well run in, when it was allowed to cool. The external lever was then driven off and the job lightly touched up with a file, the result being a perfect and substantial fit. The stripped screw being 5/16 in., a 1/4 in. Whitworth die was run down and a suitable nut fitted, while in the place of a split pin a strong spring washer was used. This made quite a satisfactory job, and completed the repairs to the gear box, which was put aside till wanted for assembling.



A mudguard was repaired by riveting and soldering a plate on the inside of the valance.

Attention was next given to the metal-to-metal plate clutch. This was dismantled and the plates withdrawn, care being taken not to disarrange the order in which they were taken out. The reason for this is that the respective steel and phosphor bronze plates adapt themselves to their neighbours and work much more sweetly if left in their original positions. To clean them, it is only necessary to tie them loosely together with string or thin copper wire and

immerse them in clean paraffin, leaving them to soak. Before removing the clutch from the mainshaft it was noticed that it was not fitting tightly on to the shaft, and though the nut was pulled up no improvement could be obtained. The main gearshaft was withdrawn, and after some time had been spent in ascertaining the cause, it was found that a shoulder required slightly filing away to allow the clutchshaft to go



**A War-time Overhaul.—**

further on to the main gearshaft; when this was done the slackness disappeared. The push rod and operating pin showed signs of wear. New ones were made out of mild steel, and when finished were case-hardened. The clutch cable was badly frayed, and a new one obtained from the makers.

The chains and sprockets were in excellent condition, and beyond a thorough cleaning did not require attention, with the exception of replacing one roller on the front chain.

**Overhauling Brakes and Wheels.**

The front brake was in good condition and needed no repairs, but the back—an internal expanding working inside the drum of the back driving sprocket—was, judging from its recent behaviour, suffering from a worn-out Ferodo lining. When thoroughly cleaned and inspected, however, this was not found to be the case, the lining being at least  $\frac{3}{16}$  in. thick, and perfectly even all round. The unsatisfactory working was caused by the rivets projecting slightly above the lining, and attention to these cured the defective operation.

The wheels were expected to require a certain amount of attention, as I had been aware for some time past that all was not right with the bearings, not that they compared unfavourably with those of the numerous other machines I have possessed—in fact, rather the contrary, the bearings themselves standing up well, but the locking device would not stand the severe side thrusts imposed by a heavy sidecar. I have not in my long experience found any front wheel ball bearing that would stand for more than one month without attention when a heavy sidecar is used. It was desirable, therefore, to remedy this defect, and the only solution that suggested itself was the fitting of tapered roller bearings to take up the end thrust. Timken taper roller bearings, made by the Electric Ordnance and Accessories Co., were obtained, and the remarkable part of it was that these fitted the hub perfectly (after the old ball bearings and cones had been removed) without any material alteration to the original hub. This was exceedingly fortunate, and materially assisted in eliminating the trouble of an unsatisfactory front wheel bearing, and as the wheels are interchangeable both were treated.

**Rims.**—A considerable amount of rust had accumulated in the bead of the rims. This was removed with the aid of a screwdriver, file, and broken hack-saw blade, and finished off with a thorough scrubbing with the wire brazing brush.

**Forks.**—These were completely dismantled, and being in good condition required no renewals.

**Mudguards.**—The mudguards had suffered somewhat from rust, and both were broken almost across, the back one so badly that a new one was obtained. The front was cracked in the centre, between the forks, but, apart from being rusted inside, was in fair condition. It was decided to try and repair this by

soldering and riveting a piece on either side. First the guard was cleaned inside and out by removing all enamel and rust. Old sheet metal is difficult to solder unless thoroughly clean, and a bad repair is worse than no repair at all. Having thoroughly cleaned the metal, it was tinned with solder, the flux used being "killed" spirits of salts into which a small quantity of sal ammoniac had been dissolved. My experience with the various compound preparations sold for soldering is that they do not come up to the old-fashioned "spirit" for satisfactory results. For mending and strengthening the broken portion I used a piece cut from the scrapped mudguard, as I then had a beaded edge at the bottom which would add strength to the repair. This was cut to size, cleaned, and tinned with solder. The small blow-lamp came in very useful here, as, after tinning, the work was again heated and the superfluous solder wiped off with a cloth. The reason for this was that if there is any quantity of solder left on the metal you cannot rivet the two plates closely together and therefore secure a good joint. The strengthening plate and mudguard were then clamped together and a hole drilled through the two. On either side of the crack a small  $\frac{1}{8}$  in. copper rivet a quarter of an inch long was inserted, a copper washer being used on the inside and the two well riveted together. Thus fixed, it was quite easy to drill the necessary number of holes and rivet the two members together. The manoeuvre was repeated on the opposite side of the mudguard, and a very strong repair effected. This, however, did not complete the job, as the blow-lamp was again brought into use. The riveted portion was again heated and more solder run in, which would adhere to the already tinned plates, very much strengthening the repair. A little solder was also melted into the crack on the outside of the mudguard, and when cleaned up with a file the crack was hardly visible.

**Care of Control Wires.**

Nothing is more annoying to a driver than the inability to control an engine easily in consequence of defective or frayed Bowden wires. Possibly no part of the machine has less attention than the latter, with the result that they are neglected until they either break or refuse to move in their casings. Periodical attention will ensure the perfect working of these almost indispensable fittings. The machine in question had been from time to time examined, and when possible thin oil run down the casings and the exposed parts greased. When dismantled, every wire with the exception of the exhaust lifter was found to be perfect. The exhaust wire and casing had been accidentally pinched and did not work freely. These were both replaced, care being taken that the lengths of both were exactly the same as the old ones. E.M.

[In Part II. the repainting of the motor cycle and thorough overhauling of the sidecar body and upholstery will be dealt with.—ED.]





# A NEW AMERICAN FLAT TWIN.

Many New Ideas embodied in a Somewhat Unconventional Design.

**T**HE latest flat twin to make its *début* in the States is the 354 c.c. Paramount, produced by the Paramount Motor Co., a firm hitherto associated with the production of automatic screwing machines and other fine gauge work of that kind.

The Paramount motor cycle possesses many novel and excellent features, and the chief claims of the manufacturers are centred around its vibrationless and noiseless running. The layout of the engine is somewhat peculiar. Our photograph shows the fly-wheel side of the machine, and on the opposite side is the transmission.

## A Unique Valve Mechanism.

On the crankshaft is mounted a phosphor-bronze skew pinion which engages with a pinion giving a 6 to 1 ratio. This second pinion is mounted on the camshaft, and the valves are operated by means of three cams running at one-sixth engine speed. This patented mechanism is claimed to be absolutely silent, and if this be carried out in fact the system is certainly worthy of the attention of British manufacturers. The large 6 to 1 pinion is coupled direct to the clutch, which is of the multiple-disc variety containing ten gin. discs. Its very considerable friction surface permits an unusually smooth action, while indefinite slip can be permitted without heat owing to the light pressure on the plates. It will be seen that, by means of this design, an absolute minimum of driving pinions are employed, and thus friction and noise are proportionately reduced. The two pinions already referred to are the only two in the entire unit, and answer the purpose of driving the valve mechanism in addition to transmitting the power. The magneto is contained in the flywheel, and here, too, the use of gearing is eliminated. The patented magneto is claimed to be absolutely foolproof and mudproof, and, while it requires no adjusting whatever, it is stated to produce a very hot spark, even at low engine speed.

## Transmission and Frame Design.

The driving pinion is mounted on a large double row annular ball bearing, and the highly efficient clutch answers the purpose of gear box, as in the case

of the 7 h.p. sporting model Indian. The clutch is controlled by means of a long hand lever, which can be notched in any position to give the desirable amount of slip.

The carburetter also is uncommon in motor cycle practice, in that no springs are employed anywhere in its mechanism. All adjustments are external, and it is claimed to give the engine an exceptionally good tick over on the pilot jet.

The frame, it will be noted, is of the cradle or loop variety. The curved frame member from the

steering head to the engine bracket is not suggestive of strength, but in all other respects the frame design appears to be passable. This curved member is of seamless steel, and its bottom extremity is let into a drop forged T. At the back end of the cradle is a second drop forged T, from which straight tension stays extend to the rear wheel spindle.

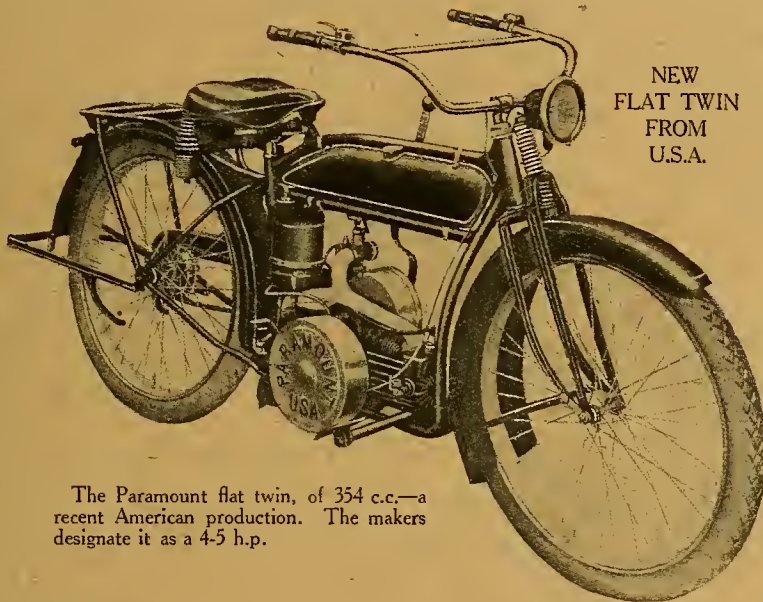
The drive is direct from the clutch by single chain, and the

gear ratio on positive drive is 6 to 1.

The front forks, it will be noticed, are somewhat on P. and M. lines, minus the spring sheaths. The "gasolene" tank is pressed out of a solid piece of deep drawn steel and is absolutely seamless. Twenty-six inch wheels are employed, and the kick starter is entirely enclosed. Only one brake is fitted, this being an internal expansion brake in the rear wheel.

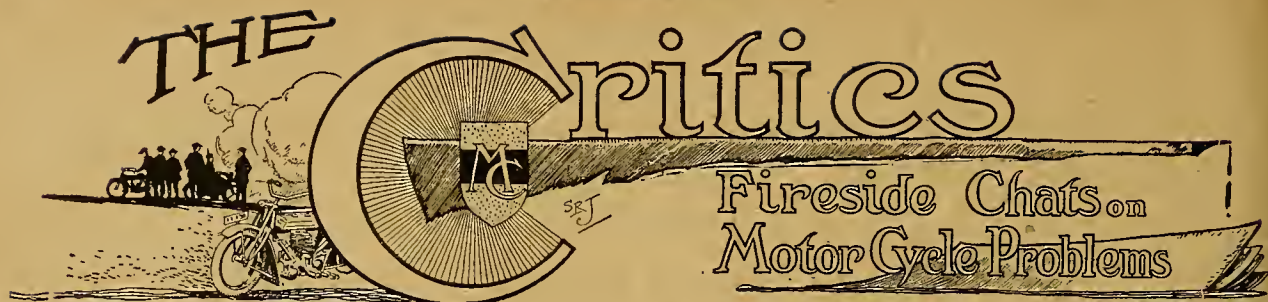
## Following British Practice.

It would appear that this machine is an outcome of British practice. The flat twin of approximately the same c.c. has rendered such excellent service in France that the Americans frankly admit that a huge market awaits this type of mount in the States. We have in the Paramount what is practically equivalent to a Douglas, with the exception that a highly efficient clutch takes the place of the gear box. It is claimed that, as a solo mount, the Paramount is equal to any road conditions, and its h.p. is set down by the makers at 4-5 h.p. The 6 to 1 camshaft is certainly an interesting feature, and the great reduction in pinions and engine parts opens up a new line of enquiry. We look forward also to the adoption of the flywheel magneto over here.



The Paramount flat twin, of 354 c.c.—a recent American production. The makers designate it as a 4-5 h.p.





## HANDLE-BARS.

"THANK goodness," sighed the D.R., "that manufacturers have at last brought a little common sense to bear in the matter of handle-bars."

The elderly member of the trade regarded him narrowly. "It's not a question for the manufacturers at all," quoth he. "At the moment we are catering for the young blood—the D.R.—and we have pampered for his popular fancy, much against our own convictions."

"Not all D.R.'s are 'young bloods,'" retorted the Discharged Soldier, promptly. "The majority are experienced men, who are seriously in earnest. Nor is it a matter of popular fancy, but rather one of dire necessity. The semi-T.T. bar has been chosen because it gives proper control—not because it is 'knuttish.'"

"Quite true," agreed the Novice, "but at the same time you must admit that the D.R. is a young man, and generally a hard rider. Naturally he prefers the sporting bar; but that in no way proves that the touring type is wrong or that other people do not want it."

## Design of Necks.

"Moreover," pursued the Manufacturer, "the present type of wide bar was fashionable before the war. I myself was caught by the invasion, and invested in a pair, only to discover that they made my neck ache."

"That was because the design of your neck was wrong—not the bars," the D.R. told him, bluntly.

"If one has a giraffe's neck and a serpent's body," sneered back the Manufacturer, "then doubtless one could ride all day in comfort with that type of bar."

A momentary silence followed. It was noticeable of late that the friendship between the Manufacturer and the D.R. was becoming somewhat strained. Presently, to even things up, the Journalist took the Discharged Soldier's part. "I have used semi-T.T. bars for years with comfort," he observed, "and therefore I must have a giraffe's neck and a serpent's body. I, moreover, am not a young blood; in fact, I am rather getting on in years; yet if I had any choice in the matter I should never use touring bars."

The Novice turned to the D.R. with the air of having suddenly remembered something. "Look here," he said, "quite recently you rode from London to Coventry in pretty fast time on an Indian fitted with extreme touring bars, and on arriving here you told me that the position was thoroughly comfortable. Remember that?"

The D.R. fumbled with his watchguard. "Sure I do," he agreed. "I have ridden scores of machines with touring bars,

which I admit were comfortable, but that does not alter my opinion as to the design being wrong. I say that the upward-sweeping bar is, like the average mud-guard and front wheel brake, an undesirable relic of pedal cycle days which would never have occurred if the motor cycle had possessed no predecessor."

"But why is the touring bar wrong, I should like to know?" demanded the Novice.

## The D.R. Bored.

The D.R. looked bored. He turned to the Journalist. "Oh, tell him!" he pleaded.

"Well," the Journalist began, "in my opinion it is wrong, because, in the motor cycle, we have three important factors to contend with which in the pedal cycle do not enter into the reckoning—namely, speed and weight (which demand maximum control), wind resistance, and the constant forward pull of the machine. To counterbalance the latter the rider should lean very slightly forward, otherwise the whole of the strain falls at the bottom of his back. By leaning slightly forward he lessens wind resistance, and thus further relieves his muscles. Moreover, if the design of the bars is such that the forward pull is taken through straight arms with the body in a comfortable and natural position, it is obvious that the constant forward pull is less tiring to the biceps of the arms than if it be taken through bent elbows."

"Hear, hear!" muttered the D.R. "I couldn't have put it more clearly myself."

But the Manufacturer was becoming restive. "I don't think your arguments hold water," he stated. "In the pedal cycle there was a *real* reason for using dropped bars, because they gave you better control of the pedals, but on a motor cycle, provided the steering and balance are perfect, it should not be necessary to resort to leaning forward and stooping. My present mount positively steers itself. I could ride hands off along a chalked line at anything between 10 and 40 m.p.h. Why then should I resort to a congested and unnatural position?"

"Just so," agreed the Novice; "if the design of a machine is so rotten that one has to resort to racing bars for touring purposes, then the best thing for the designer to do is to try something fresh. Personally I think that the best and most natural position is the one you would assume when seated naturally on the saddle—that is, with the bars comfortable near to you."

"What is your most natural position?" queried the Journalist. "Take yourself—take a savage seated by his fire. He sits with his body inclined slightly forward, his elbows on his knees, so as to relieve his spine."

"Of course he does," the D.R. added. "An upright position is not the most natural, because all the weight is on the back. Moreover, you cannot say that your most restful position when the machine is stationary is necessarily the most restful when the machine is going, because, with the machine stationary, neither wind resistance nor acceleration is exerting its influence."

"Do you know," queried the Manufacturer, "that in France to-day the D.R.'s bend their semi-T.T. bars by hand to suit their requirements? Half of them cuss the extreme bars now sent out, and before they ride a new machine they redesign the bars to a more moderate shape."

"Individual tastes naturally exist," observed the Journalist. "But do you consider that the distribution of weight in the Scott motor cycle is good, and that the steering is as near perfect as on any present-day motor cycle?"

"I do," stated the Manufacturer. "You do? Then let me tell you this as illustrating the point of control. Recently I possessed a Scott, fast, though not freakish. I had the ordinary touring bars, which were so comfortable that I threw discretion to the wind, and stuck to them. The result was that three times in about three weeks I came an awful purler on corners—my front wheel simply shooting straight from under me in a dry skid ere I had any notion that I was taking risks. My landlady implored me to sell the machine—(cheers from the D.R.)—but I said 'No! I will obtain a pair of T.T. bars.' I got them, and after that, not only was my control more perfect, but I seemed better able to estimate the speeds at which I could safely negotiate bends. I had no more spills."

## The D.R. Tries a Flat Twin.

"Let me substantiate that," said the D.R. "Recently I went to Nottingham, and Mr. Brough lent me one of his flat twins to make a journey of fifty miles. The machine was fitted with ordinary touring bars, and on my return I told Mr. Brough that, owing to its speed, it was positively dangerous with bars of that type. He agreed, but said purchasers desired them."

"Returning to Scotts," argued the Manufacturer. "Let me tell you that Tim Wood, who should know something



**The Critics.**

about that make, always rides ordinary touring bars because he prefers them, and so did that other man they used to have—Stewart, the trick rider. Those men ought to know.”

“And what about the recent American speed records which have astounded the motor cycle world?” put in the Novice. “You yourselves admitted, when we discussed big twins, that these records were as much a test of human endurance as of machines. Well, let me tell you that the creators of these records rode what you would call extreme touring bars. If the layout of the human anatomy is such as to demand T.T. bars, how then is it that these men have endured wind resistance and speed which beat all previous records in history? Could they have done it if their spines were subjected to undue strain? Could they have done it if their position and their control were wrong? Assuredly not! Therefore you two are talking through your hats.”

The Journalist observed that he had never possessed a hat worth talking through since the Novice came to visit

him. Hat stands, he remarked, were considered by some people as an open exchange.

**Sticking to the Point.**

The D.R. observed that the landlady was evidently out of coppers, and that the gas was going down. “Why don’t you put Indian or Henderson lighting installations to an endurance test?” he asked the Journalist.

“You two chaps are trying to shin out of it,” observed the Manufacturer, bluntly. “We are waiting for a straightforward reply to our last argument.”

“My reply is this,” said the Journalist, “that only one thing can decide this argument—that is, personal taste. It is a subject which is even open to debate, which proves definitely that it is a matter of personal taste. Every rider must decide for himself which type best suits his requirements. The staid individual should not condemn the T.T. type because he considers it knuttish, neither should the youthful enthusiast condemn the touring type because he regards it as ‘old gentlemanly.’ Practical men of the road should be above such petty bias. I like the T.T.

type; you like the touring type. Very well then; let manufacturers do as they have done in the past, and supply both types to order.”

Everyone agreed that this was sensible. “But,” said the D.R., “on the Indian we have an adjustable bar, which gives one a wide range of movement to suit one’s stature. I think British makers might advantageously follow this lead. After all, the most comfortable position for the bar depends very largely on the position of the footrests. In my opinion, both should be adjustable within a reasonable range to suit the length of limb of the rider. Those who agree kindly signify in the usual —”

Four hands went up, while the Journalist’s dog, having spent the last five minutes in a futile endeavour to catch a bluebottle, finally, at this very crisis, downed him and ate him. But, in truth, the bluebottle was still at large, while the worthy canine, gazing in adoration into his master’s eyes, wist not that what he had eaten with the relish of a conqueror was a well-baked sultana, dropped from a war-time scone that tea time.

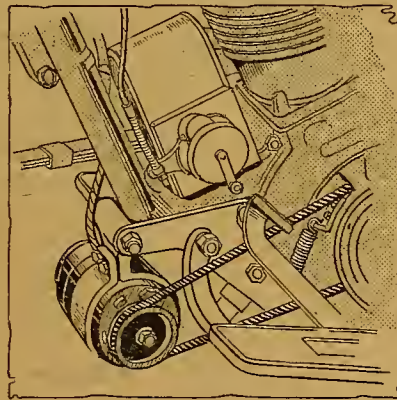
## A New Lighting Dynamo from the States.

The Latest Splitdorf Dynamo is Easily Attached to any Make of Motor Cycle.

A VERY interesting dynamo lighting set which should meet a popular demand, since its simplicity renders it readily adaptable to any make of machine, has been produced in the States by the makers of the well-known Splitdorf and Dixie magnetos, and has recently undergone a series of exhaustive tests by which its efficiency is proved. The new Splitdorf dynamo is a small and compact unit of remarkably high output, and it can be attached to the frame in any position which permits the drive from the engine-shaft. This drive is by spring belt, the generator running at one and threequarter times engine speed. The output can be varied to suit demands, but for ordinary use it is used in conjunction with a 6 volt 15 ampere-hour storage battery.

**Wiring and Control.**

One attractive feature of this model, which is known as the DU-1, is its entire absence of outside fittings, and, except for the simple ampere meter, the unit is self-contained. An automatic control regulates the current between the generator and the storage battery, discon-



The new Splitdorf dynamo. Note the clean exterior and the single wire. The second connection is earthed.

necting the battery at low speeds, and connecting up again when the dynamo voltage rises above the battery voltage. This control, we are informed, is not electrical, and, therefore, we conclude

that it is operated on the governor principle, the makers claiming that its working cannot be hindered by road shock.

**A Simple System.**

The wiring is simple, the “earth” system being employed—the single wire passing direct from the generator to the ammeter placed on the top bar, then on to the battery. The ammeter can be dispensed with if desired, but the makers point out its usefulness in indicating the exact condition of the battery, which otherwise must be left to guesswork. The regulating device is so arranged that it can be set to give an increased output for the winter months when the system is in constant use, so that overcharging or undercharging can be avoided by means of a simple adjustment. It is noteworthy that the Splitdorf Co. has diverted from popular American practice in producing a system in which the lighting and ignition are entirely separate, so that failure on the part of one does not involve the other; and if this readily adaptable unit is to be marketed at a popular figure, there is no doubt that it will be in demand.

## Chain Speed and American Methods.

IT is not always realised that a low-speed chain is subjected to greater tension than a high speed, and that it is not tension that decides its life. In an all-chain drive, the chain from the engine to the countershaft is subjected to less tension than the main drive, yet it is generally the first to go on account of the higher speed at which it runs. An enclosed pinion drive from the engine to the crankshaft is mechanically better than a chain, but, unless skilfully made and

designed, it would probably prove a good deal noisier. Fibre pinions might go a long way towards eliminating noise, and in this we can take a hint or two from America.

Dwelling still further upon the trend of American affairs, the rear car, though it may appeal to us as ugly and cumbersome, offers certain advantages for trade purposes. In the first place, the wheels of the car entirely support the load it carries, and an overload does not

impose any extra strains on the motor cycle frame. The motor cycle obtains a straight pull, and there is no question of alignment. One becomes used to the appearance of the beast, and we understand that it is capable of carrying enormously heavy loads without detracting very noticeably from the speed of the machine. As a trade attachment it undoubtedly has its virtues; yet another among which is the ease with which it can be attached and detached.



## MILITARY NOTES.

### Comment on Despatch Riders—their Dangers and their Work.

#### G.S.W.A. CAMPAIGN.

**R. OTTLEY** (Lt.), who was in the G.S.W.A. campaign, writes us concerning the photograph published on this page: "I have unfortunately forgotten the actual name of the place in G.S.W.A. where my snap was taken. While we were attached to the Inf. Brigade, under Gen. Bevis, myself and six despatch riders were sent ahead in advance of our squadron as scouts when we came across the bridge shown in the photograph, which had been blown up by the Germans only a few minutes before our arrival."

□ □ □

#### D.R.'s AND THE DANGER ZONE.

**L. T. D. PARBURY**, of the A.S.C., writes as follows, taking exception to statements as to the number of motor cycles which have been damaged by shell fire: "Referring to *The Motor Cycle* of June 14th, 1917, do not you think it is rather unfair to alarm people at home by such exaggeration as to the dangers to which our motor cyclists are exposed? Being connected with a motor cycle casualty clearing station, I can assure you that not more than 1% of damaged motor cycles have suffered from shell shock. It may be a very sensational statement that most machines have been shelled, but it is not true. The five or six examples produced by the corporal-artificer would be nearer the truth."

#### A YOUNG D.R.

"I WAS very interested in the paragraph in *The Motor Cycle* respecting the youngest despatch rider. Although I cannot claim to have been a despatch rider, I can claim to have ridden a Triumph within the range of machine guns as well as other guns, round that much-heard-of salient of Ypres, at the age of 15½ years. I joined the R.A.M.C. in May, 1915, at the age of 15 years 21 days, and went to France on September 8th of the same year. I eventually arrived at a Field Ambulance attached to the Guards Division, where I remained till July 24th, 1916. I may say that the ride landed me in hospital for three days, owing to running into a shell hole and getting thrown out and injuring my shoulder slightly. Wishing you success to the 'Blue 'Un,' **ROBERT JUYOMS.**"

□ □ □

#### SARCASTIC.

**CPL. A. SIMPKINS** writes us in a sarcastic vein anent the articles on "D.R.'s and their Work." It is natural that views on such a wide subject should be diverse, and we publish this candid criticism as giving another point of view on the work of despatch riders.

"After reading the second article on 'D.R.'s and their Work,' by 'D.R.,"

may I ask what D.R. stands for? Surely not despatch rider. If it is supposed to be a descriptive article of a D.R.'s life, probably it was in some other war—not this. When I read of spy chasing and submarine hunting it makes me think they must have a war on in Blackpool.

"I have had over two years' experience in France as a Divisional D.R., but I cannot recognise my job. And having photographs taken—My! I would not care to be the man caught with a camera anywhere within five miles of the line: sudden death or lesser punishment would be his portion.

"It is now clear why the corduroy plank roads are made, and why the huge shell holes filled with boulders—so that the D.R. may have his photograph taken; but why (do the shells scream so much and bite chunks out of the road? Not for the same reason surely.

"If the article refers to this war it is as true to life as the Irish professor's description of a crab: 'A small red fish which walks sideways.'"

□ □ □

#### NEW TANK COMMANDER.

**THE Duke of Westminster**, who did so much good work with the Armoured Car Section in Egypt, has now returned to England, and has been appointed second in command of one of the Tank battalions.



Advance scouts in German South-West Africa crossing a bridge which had been blown up by the retreating Germans only a few minutes previous to the photograph being taken.



# ROAD EXPERIENCE WITH COAL GAS.

The Results of some Practical Experiments Arising from the Petrol Scarcity.

**D**RIVING petrol motors with coal gas is nothing new. The writer as far back as 1901 successfully ran an engine with it. The cause that led up to the experiment was the fracturing of a petrol supply pipe on a test bench. Motors in those days would not allow of a glass of water standing on them while running under test at 4,000 r.p.m., hence the fracturing of the petrol pipe.

The engine in question was turned out by an amateur from particulars given in a journal on "How to Make a Motor." It certainly ran: it also walked the test bench about the shop. The experiment with coal gas was fairly successful: trouble was caused by water in the pipes, which gave an unequal pressure, but ultimately a fabric bag was rigged up, the supply drawn from this, and smooth running as far as the engine would allow was obtained.

For some time now many works have adopted coal gas for test branch work, so little more was required in the fitting up of a motor cycle having a suitable chassis.

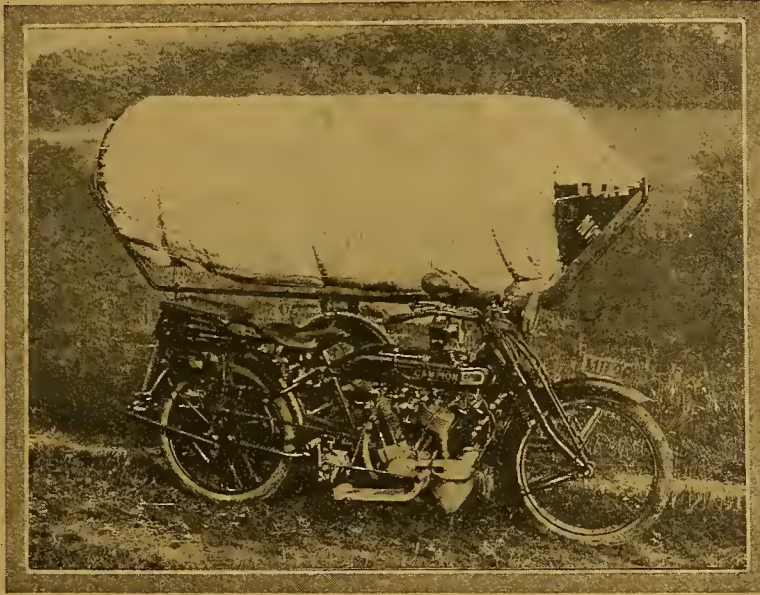
Messrs. Campion, of Nottingham, having received urgent orders for aeroplane fittings that required oxygen welding, were frequently tied up owing to the non-delivery of the oxygen cylinders by the railway company. No local supply being available, some quicker and surer way of getting delivery was necessary. Petrol being out of the question, recourse was had to coal gas, which, it may be at once explained, has given highly satisfactory results, and for those people who do town running or short distance work the question of propulsive power is solved. Experiments are being carried out which will still further enhance the value of coal gas, but particulars cannot be given at this stage. The running of the motor cycle and sidecar fitted with gas container has caused a mild sensation locally. The Campion motor cycle is fitted with an engine of large capacity, being an 8 h.p. twin J.A.P., having cylinder measurements of 85.5 x 85 mm.

Owing to the heavy weight to be carried and the condition of the roads, and having at one part a stiff hill with a 1 in 7 gradient, the question of a larger mileage with a 4 h.p. engine was ignored. A specially strong sidecar chassis was fitted capable of carrying oxygen cylinders weighing well over 3 cwt. The journey out and home to the Brush Works,

Loughborough, is thirty miles. For the return journey a recharge of gas was taken up at Messrs. Campions' local depot at Loughborough. The return journey, being somewhat easier running, was taken on a top gear of 4½ to 1.

The capacity of the envelope, which is well raised above the chassis, is fifty cubic feet. At the Nottingham power rate of 2s. per 1,000 feet of gas, this works out at a little more than a rd. per charge of fifteen miles, and it is important to note that this is made with an engine of large capacity with a fairly large jet, pulling a heavy load over indifferent roads having stiff gradients. The envelope, which is tested up to a pressure of 12in. of water column, can be filled without any mechanical assistance, a small length of rubber pipe being all that is necessary, but

to facilitate filling it is better to unscrew the burner. The time of filling varies with the diameter of the supply pipe; a 1in. pipe as usually fitted in a garage would fill up in about thirteen minutes. The matter of fixing up such a supply in all the East and Midland County depots of Messrs. Campions is being considered. A very important point is that no over-charging of the envelope can take place. No matter how long the envelope may remain in connection, the pressure from the



The 8 h.p. Campion used in carrying out the tests.

main varies from 3in. to 6in. water column, dropping down as low as 1½in. on the occasion of a Zeppelin raid alarm. The charging is arranged from the bottom of the envelope, the gas immediately rising in the bag to its highest point: an interesting fact is that no escape occurs when fully inflated, even with the bottom tap left open. Owing to the gas being well above the point of supply, no back pressure occurs, as when fully charged, and before any running of the engine has taken place, if the machine is taken in the sunshine, there is an immediate raising of the pressure, the fabric bulging out between the supporting cord in the same manner that a scent spray bulb will distend under pressure.

As in a balloon, normal pressure is restored by opening the control tap at the bottom of the envelope, which allows excess pressure to escape, and it is important to remember that the escaping gas being unadulterated is *not* explosive. After standing fully charged for a period of three to four days there is



### Road Experience with Coal Gas.—

a loss of not more than one half to one cubic foot of gas. When running a change over from coal gas—which, by the way, requires all possible air—to petrol the change can be made in the easiest possible manner without stopping. The gas in the bag is drawn off by engine suction to the last fraction, so much so that the envelope collapses and the sides are held together

by atmospheric pressure. After a short time one gets quite accustomed to the unconventional fitting on the sidecar, which is by no means clumsy to drive. Demonstrations have been given before a cinema operator, and when the films are released motor cyclists will see with what ease figure 8's and circles are taken on a narrow road. The only alteration required to the machine is one that will cost but a few coppers.



## Further Records on the American Speedways.

### NEW U.S.A. SPEEDS ACCOMPLISHED.

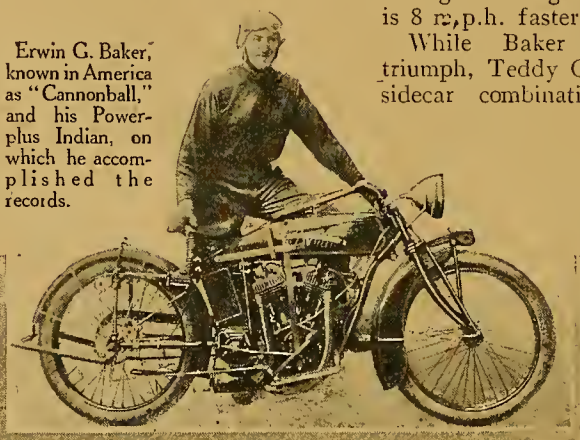
As will have been seen from these pages, there has been a good deal of record-hunting going on lately in the United States, where there appears to be petrol enough and to spare, and, notwithstanding the demands of the U.S. Navy and Army, motoring is still able to progress, and there is considerable activity in the motor cycling world.

At Cincinnati, on August 15th, Erwin G. Baker, who has earned for himself the pseudonym "Cannonball," again established motor cycle records on his Powerplus Indian on the Speedway in that City, thus duplicating his performance on June 28th on the same track.

Baker set up a new twenty-four hour record of 1,534½ miles, a twelve-hour record of 821½ miles, while he covered 500 miles in 6h. 14m. 15s. Both the 500 and 1,000 mile times are world's records.

Baker's record of 1,534½ miles exceeds that formerly held by Parkhurst (Harley-Davidson) by 81¾ miles. His time for the 1,000 miles was 54m. 13s. better than that of Parkhurst, and for the 500 miles 36m. less. Baker also eclipsed his own record of 702 miles in 12h.

Erwin G. Baker, known in America as "Cannonball," and his Powerplus Indian, on which he accomplished the records.



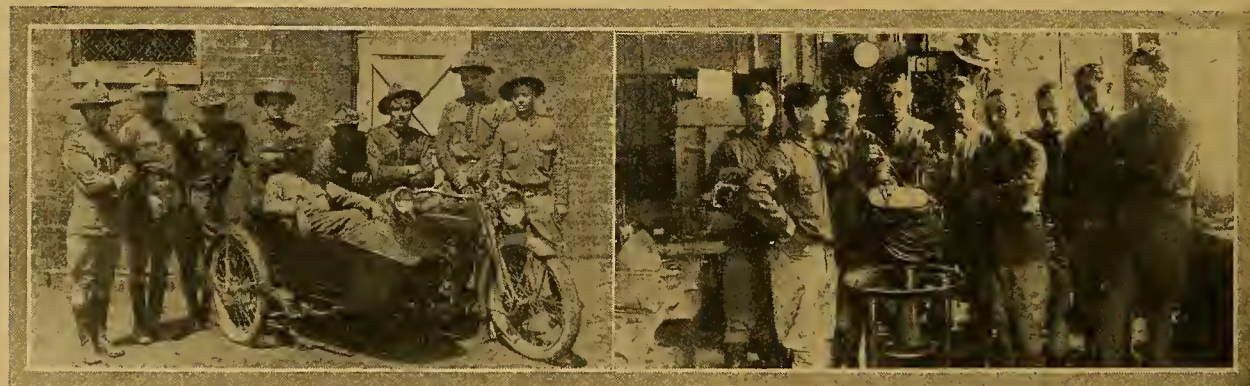
The average speed for the entire twenty-four hours was nearly 64 m.p.h. as against 60½ m.p.h. average on the occasion of his former record. This is certainly a wonderful average. The time occupied by Baker when he was not riding was 2h. 23m., so that his average running speed was 70.9 m.p.h., which is 8 m.p.h. faster than his previous record.

While Baker was gaining triumph after triumph, Teddy Carroll, on a Powerplus Indian sidecar combination, taken from stock, was

establishing new times for the twenty-four hours and intermediate distances. In the twenty-four hours his distance was 1,275½ miles, improving upon the former figure made by Walker by 117¼ miles. Carroll covered 500 miles in 8h. 56m., and 1,000 miles in 18h. 48m., while in twelve hours he had travelled 661½ miles, setting up new world's records. For the

500 miles he was 51m. 42s. better than Walker. He covered the 1,000 miles in 1h. 34m. 46s. less time than the previous record holder, and averaged over 53 m.p.h. for the entire twenty-four hours.

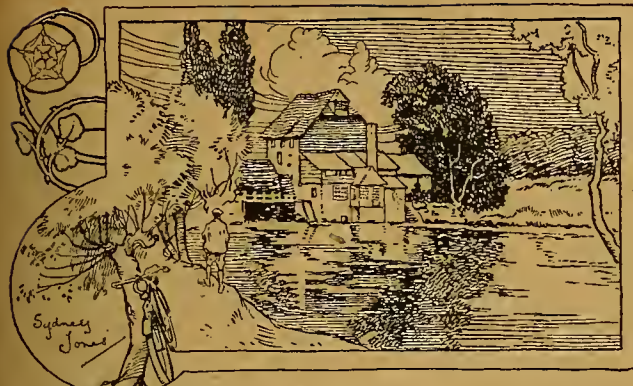
The many extraordinary records that have recently been put up in the States have none of them for long remained unbeaten, and it is conceivable that the above remarkable times will, in the near future, be eclipsed.



THE FIRST CLASS OF PUPILS AT THE HARLEY-DAVIDSON SCHOOL OF INSTRUCTION.

In order to familiarise army officers with the construction and mechanism of the motor cycle, the Harley-Davidson Service Department has been made a school of instruction. This primary tuition will be succeeded by lessons on driving and repairs on the road





## MEMORIES OF THE OLDEN DAYS.

### SOME REMINISCENCES OF A PIONEER MOTOR CYCLIST.

“Où sont les neiges d'antan?” “Where are the snows of yester-year?” How can we ever recapture that feeling of “the first time,” the first hearing of “Tristan und Isolde,” the anticipation in cutting the leaves of a great book, the first soar into the third dimension on a modern aeroplane, and—our first run on a motor cycle!

1904 seems a long while ago now; peace had just come, and the writer was one small unit in a big public school. Every week we eagerly devoured *The Motor Cycle*, and about the time of the National Show our pockets would bulge with catalogues. These were the days of Edge and Jarrott, George Barnes and Hooydonk, and many others. Save perhaps Harry Martin and Tessier, where are they all now?

A few years before I had seen my first self-propelled vehicle—a De Dion tricycle, with the  $2\frac{3}{4}$  h.p. engine (high power for those times) mounted over the back axle. It chugged solemnly round Battersea Park and disappeared, leaving a small boy whose only wish in life was to possess one like it!

The early “Bat” motor cycles, with  $2\frac{3}{4}$  h.p. De Dion and M.M.C. engines, came in later. At one time this capable machine, with its quaint handle-bars and round brass tank, held every record between one and fifty miles.

Who that heard it will forget the queer hollow note of its automatic inlet? The makers dispensed with pedals, and there was a great discussion at the time as to the advisability of this, for how was one to get home? (That was a paramount question in the days of accumulator ignition. I shall never forget seeing the unfortunate owner of a hefty twin “Rex” pedalling his several hundredweight of iron with the belt off, his feet spinning round to a fifty gear with tiny cranks. It was a labour of Hercules.) But the “Bat” came and conquered, and we never went back to pedals.

#### Hill-climbs and Racing.

One of the great events of the year at that time was the Westerham hill-climb. This is a declivity that even nowadays compels respect; the long rise from the village before the actual hill is reached calls for an engine with stamina. The Chase-Jap match, which Chase won by a narrow margin, is still remembered in the village.

By this time the sport was in full swing, and Harry Martin on the old high-built “Excelsior” (inclined M.M.C. engine, I think it was) hotly contested the honours with Hooydonk, on the Minerva-engined

“Phoenix.” I can see them now, the old crowd, roaring round the easy bends of the Crystal Palace track, craning feverishly over their tanks, squatted on luggage carriers (the racing man at least realised the danger and uselessness of the old high position).

#### Forecars to 3 h.p. Machines.

What a far cry from those days to my imperturbable little Douglas, and how I could have swept the board with it if I had only had it then!

About this time the makers turned to passenger-carrying vehicles. Forecars were bolted on to 3 h.p. machines. Speed gears were not, and often we walked, pushing several hundred pounds of sullen and over-heated machine. Heavy three-wheelers with labyrinthine machinery came into vogue, and died a natural death.

Racing motor cycles had to come within a weight limit, 110 lb. I think it was, and we were at fearsome shifts to crowd 12 h.p. into these limitations. Somehow we did it, with light gauge frames, cycle tyres, saddles cut into patterns, and pulleys drilled till they were mere cobwebs. It was a risky game, and many a frame lug was found cracked after a speed burst.

#### 14 h.p. Peugeot.

I well remember the famous Brighton meeting, when Cissac came over with his 14 h.p. Peugeot wonders, geared about  $1\frac{1}{2}$  to 1, which according to popular rumour destroyed one back wheel, tyre and all, each time they were used! Barnes put up a very plucky fight against the Continental crack on a little 5 h.p. Deckert single-cylinder, with ports drilled below the piston stroke as was our practice then (and the oil they used!) At that meeting Rolls and Moore-Brabazon drove, and there appeared the 200 h.p. “Dufaux” car, all engine, with a cane seat lashed on somehow—a fearsome beast, which was badly beaten by several more practicable monsters of considerably lesser power.

But Rolls is dead, and of all that merry company of sportsmen, how many shall we meet when the war is over? Never mind, it was there they learned to “play the game,” and our Teuton friends can bear witness that they play it well.

R.H.B.

#### NOTICE.

The Editor disclaims all legal responsibility in any way for loss of copy in the form of manuscript, drawings, or photographs submitted to him. Rejected matter will only be returned provided a stamped addressed envelope is enclosed for the purpose.



# Current Chat

Time to  
Light Lamp

Special  
Features



## SUMMER TIME.

Sept.	6th.	...	...	8.5	p.m.
"	8th.	...	...	8.1	"
"	10th.	...	...	7.56	"
"	12th.	...	...	7.52	"

## Captured German Motor Cyclist Airman.

Von Shultz and Flink, two interned enemy airmen—the former said to be a motor cyclist—who escaped from Maidenhead, and were captured by a police dog in a Kent lane leading to Cudham, are said to have planned to escape on an aeroplane. It is more probable they hoped to hold up a sidecar near a certain Kent common, a favourite rendezvous for motor cycle short runs.

## A Very Raw Recruit.

For some time past we have noticed one who is obviously a beginner riding in the residential districts of Coventry apparently in fear and trembling during his evening leisure. He rides a very neat little Douglas machine; and should he chance upon these lines, we wish to inform him that during the last fortnight or more his engine has been firing in one cylinder only.

## Second-hand Prices in France.

Our French correspondent writes us: "I read in *The Motor Cycle* the suggestion that Red Cross war worn motor cycles might be sold here. If anything in this line could be done it would gladden the hearts of most of us. High prices! A Rudge, second-hand (already spoken of to you), T.T., I.O.M. model with few alterations, brought to its lucky owner 2,400 francs! Taking £1 as equivalent to 25frs., this amounts to £96! I regret I sold my Rudge at the beginning of the war for £40."

## Auxiliary Patrol.

There are still vacancies for men of good character as chief motor mechanics. Candidates must be over twenty-two and under forty-five years of age. Pay 5s. 6d. per diem, and allowance of 3s. per diem when not serving on shore or in depot ships.

There are vacancies also for motor mechanics. Candidates must possess a good knowledge of four-cylinder petrol engines, and have had two years' workshop experience. Candidates must be over eighteen and under forty-five years of age. Pay 2s. 6d. per diem, and allowance of 3s. per diem when not serving on shore or in depot ships.

Apply by letter to: Engineer Officer, Auxiliary Patrol Office, Admiralty, London, S.W.1.

## Motor Cyclists Wanted.

The British Ambulance Committee require immediately several motor cyclists for service on the French front. They must have had at least three years' experience in sidecar driving, should have good eyesight, as they would have to drive very often by night without lamps, and should not be over thirty-five years of age. Preference will be given to discharged soldiers. Full particulars and qualifications should be sent to the British Ambulance Committee, 23a, Bruton Street, Berkeley Square, London, W.1.

## An Irish Journalist's Success.

The Lord of the Admiralty has appointed Mr. J. C. Percy, of Dublin, well known in journalistic and motoring circles, to be Honorary Lieutenant of the Royal Naval Volunteer Reserve.

This honour has been conferred in recognition of Lieut. Percy's conspicuous services during the past two years as honorary organiser of Naval recruiting in Ireland. There are few towns or villages in the Emerald Isle which he has not visited in order to tell the story of the Navy's needs and deeds.

## Petrol Prices Again Raised.

Petrol prices were advanced by 8½d. a gallon on Monday last. This large increase came as a surprise to motor cyclists, who now have to pay over 4s. per gallon for their petrol.

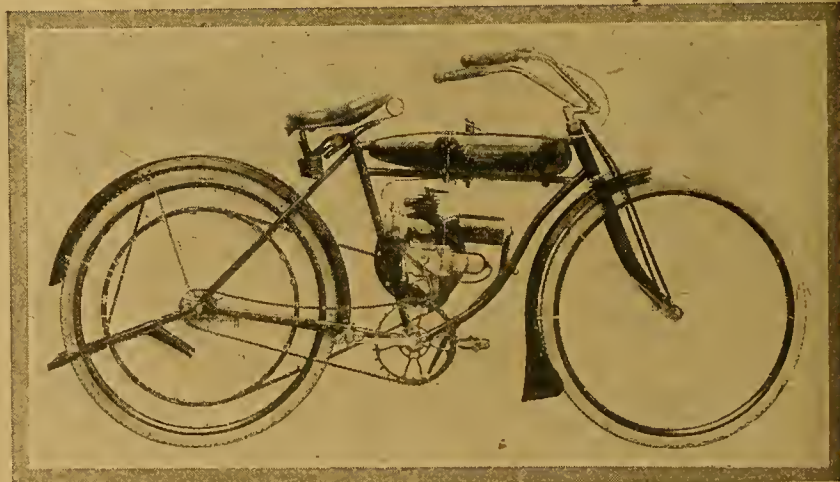
## A Warning.

While three Manchester boys were hammering a motor spirit cask, which they believed to be empty, it exploded. Two of the boys were instantly killed and the third was injured.

## Early Spring Frame.

The early spring frame model we illustrated last week, and which a correspondent submitted as an experimental spring frame Bat distinct from the ordinary spring frame model, now transpires to be a spring frame Rip, the design of which is certainly reminiscent of the early Bat models.

Old-timers will recall the first appearance of the spring frame Bat and the interest it created, making its *début* even before spring forks were recognised as attainable; while the fact that the system of springing first employed still lives signifies the soundness of the principle.



A new American lightweight, known as the Evans power cycle. It has recently been placed on the market by the Cyclemotor Corporation, New York. The complete outfit weighs only 65 lb., and can be handled like an ordinary bicycle.



### The National Relief Funds.

At the week-end the principal war relief funds stood 'as follow :

The National Relief Fund (distributed £3,641,622) .. ..	£6,226,647	0	0
British Red Cross Fund .. ..	7,256,310	9	7
Tobacco Fund .. ..	136,223	18	10

### Petrol and Race Meetings.

At the Birmingham Police Court recently six men were summoned for allowing motor spirit to be used, and for using motor spirit, for the purpose of proceeding to a race meeting. The magistrates agreed that the offence was a nominal one. Three of the defendants were fined 20s. and the driver 10s.

### "Motor Cycles and How to Manage Them."

A new and fully revised edition (the eighteenth) of "Motor Cycles and How to Manage Them" has just been published by Iliffe and Sons Ltd., 20, Tudor Street, London, E.C.4 (price 1s. 6d. net, by post 1s. 10d.)

Although during the war the progress of motor cycle design has by no means been at a standstill, developments have been mainly along accepted lines, with the aim of securing increased reliability and accessibility, greater economy, improved transmission, lubrication, and so on. Consequently no very striking alterations were necessitated in the work of revision. On the other hand, many detail improvements and alterations have taken place since the previous edition was printed, and these have been duly noted in their proper sequence throughout the book. The chapter on two-stroke engines,

for instance, has been amended, as has also the chapter on lubrication; while the section devoted to high-tension magnetto ignition has been largely rewritten, and now includes particulars and illustrations of all the latest British and American machines.

### Well-known Competition Rider Married.

Sec.-Lt. Alan B. Hill, R.F.C., late of *The Motor Cycle* editorial staff, was married on September 1st to Miss D. Nicholls at All Saints Church, High Wycombe. Mr. Hill was well known in the competition world in pre-war days as a rider of Indian and Rudge motor cycles, and he also competed successfully in several events with a Humberette cycle car. Lt. Hill has seen service in France as an ambulance driver, after which he was invalided home, but obtained a commission in the R.F.C. early this year.

### The Joy of the Open Road.

We witnessed a pretty sight the other day in the neighbourhood of Leamington—a baby two-stroke gamely struggling along with a great disabled twin in tow.

Whether the two riders were enjoying the procession as much as the onlookers is open to question. Certainly those who recognised the two riders thoroughly enjoyed the sight, especially on the inclines, when both men lustily paddled the machines until they appeared to be on the verge of apoplexy. It was a sight worthy of the gods!

### Brooklands Models.

Norton Motors, Ltd., draw our attention to the fact that very often machines are sold, possibly inadvertently, as Brooklands Specials, which do not hold the official Brooklands certificates.

The owners of Norton machines, which were sold to them as Brooklands models, can obtain confirmation or otherwise of this fact by submitting the engine number and lettering to the makers.

### Average Prices.

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks must inevitably occur.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3 1/2 2-speed .....	—	£40
Abingdon ..	1914	5-6 3-sp. sidecar ..	—	£54
A.J.S. ....	1916	6 combination ..	—	£92
" .....	1914	6 combination ..	£68	£68
" .....	1916	4 combination ..	—	£75
Allon .....	1916	2 1/2 2-speed .....	£25	£25
" .....	1914	2 1/2 2-speed .....	—	£27
Ariel .....	1915	3 1/2 3-speed .....	—	£43
" .....	1914	5-6 combination ..	£60	£59
Bat .....	1914	6 3-speed .....	—	£48
Bradbury ..	1914	4 2-sp. sidecar ..	—	£40
Brough ....	1916	3 1/2 3-speed .....	£62	£55
B.S.A. ....	1916	4 1/2 sidecar .....	£61	£66
" .....	1915	4 1/2 sidecar .....	—	£57
Calthorpe ..	1916	2 1/2 2-speed .....	£25	£30
" .....	1915	2 1/2 2-speed .....	£29	£26
" .....	1916	2 1/2 2-stroke .....	—	£28
Clyno .....	1915	2 1/2 2-stroke .....	—	£25
" .....	1914	6 combination ..	£65	£66
Connaught ..	1915	2 1/2 2-stroke .....	£25	£24
Douglas ....	1916	2 1/2 2-speed .....	£50	£46
" .....	1915	2 1/2 2-speed .....	£44	£42
" .....	1914	2 1/2 2-speed .....	£37	£35
Enfield .....	1916	6 combination ..	£84	£83
" .....	1915	6 combination ..	—	£68
" .....	1916	3 2-speed .....	£44	£46
H.-Davidson ..	1916	7 combination ..	£82	£86
" .....	1915	7 combination ..	£71	£65
Henderson ..	1916	7 combination ..	—	£100
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	5 combination ..	—	£70
" .....	1916	7-9 combination ..	£82	£82
" .....	1915	7-9 combination ..	£63	£64
James .....	1916	4 1/2 combination ..	£65	£70
" .....	1916	2-sp. 2-stroke ..	£36	£31
Lea-Francis ..	1916	3 1/2 3-sp. sidecar ..	—	£63
" .....	1915	3 1/2 3-speed .....	—	£55
Levis .....	1916	2 1/2 Popular .....	—	£25
" .....	1915	2 1/2 Popular .....	£24	£23
Matchless ..	1915	7 combination ..	£78	£83
New Hudson ..	1916	2-speed, 2-stroke ..	—	£28
" .....	1916	4 combination ..	—	£60
New Imperial ..	1916	2 1/2 2-speed .....	£35	£32
" .....	1915	2 1/2 2-speed .....	£30	£26
Norton .....	1916	3 1/2 2-speed .....	—	£52
" .....	1915	3 1/2 T.T. ....	£50	£43
P. & M. ....	1915	3 1/2 combination ..	£75	£67
" .....	1914	3 1/2 2-speed .....	—	£49
Premier .....	1915	2 1/2 2-speed .....	—	£48
" .....	1914	3 1/2 3-speed .....	—	£51
Rover .....	1916	3 1/2 3-speed .....	£68	£55
Royal Ruby ..	1916	2 1/2 2-stroke .....	—	£24
Rudge .....	1916	3 1/2 Multi .....	£42	£45
" .....	1915	3 1/2 Multi .....	—	£40
Scott .....	1916	3 1/2 combination ..	—	£60
Sun .....	1915	2 1/2 2-speed .....	—	£22
Sunbeam .....	1916	8 combination ..	—	£101
" .....	1916	3 1/2 solo .....	£72	£74
" .....	1915	3 1/2 combination ..	—	£76
Triumph .....	1916	2-speed, 2-stroke ..	£34	£38
" .....	1915	4 countershaft ..	—	£55
" .....	1915	2 1/2 2-sp. 2-stroke ..	£36	£27
Velocette ..	1915	2-sp. 2-stroke ..	—	£27
Zenith .....	1915	8 Gradua .....	—	£60

### The Motor Trade To-day.

*The Birmingham Post*, reviewing the motor trade for the week, says that the motor cycle industry is at a standstill, except in those factories which have military contracts on hand. If the materials for manufacture were obtainable, the failure of a petrol supply would be fatal to this branch of trade for the time being.

The interruption of a large contract placed some time ago on account of Russia has thrown a certain number of machines on the market. They are built very high, are heavy, and altogether not quite the type which ordinarily finds favour with British riders, but they will, no doubt, be put into service when the necessary motive power is procurable.

LADY  
SIDECAR  
DRIVERS AND  
DESPATCH  
RIDERS.



Ladies are now acting as despatch carriers and sidecar drivers for the A.I.D., their attire being service uniform of khaki. The combination is a 5-6 h.p. Clyno.



# A Thousand Miles in Nine Days.



A  
Run to the Southern  
Counties on a 3½ h.p.  
Sidecar using Heavy  
Fuel.

THE following article will, I hope, interest many motor cyclists, proving what can be accomplished by a first-class 3½ h.p. machine using 71% white spirit and 29% petrol.

First of all, let me give an account of the machine. One always likes when reading a description of a tour to know in the first instance something about the machine, as then one can better appreciate the experience of the author as one goes along with him.

The combination that served us so well was a 3½ h.p. Sunbeam, fitted with Sunbeam leg-guards. It was purchased in July, 1915, and since that date has been out in all weathers. rain or snow, and runs as well now as the first week of purchase. The only necessary overhaul, apart from clearing carbon from the cylinder, was that of the gear box.

Previous to this machine I rode a 3½ h.p. Triumph, with N.S.U. two-speed gear and Millford Empress sidecar. On taking over the Sunbeam there were two matters that disappointed me. The first was the constant changing from top gear to second on short hills, and on long hills near Bradford down to low gear. The second point I disliked was the rigid footboards. As the roads are at the present time, they were anything but comfortable, so I procured four spiral springs similar to those used on the James, and fixed these under the footboards, and thus effected a wonderful improvement. With regard to the gear, I wrote to the makers and asked if they would supply me with a 14-tooth sprocket to make the top gear 6 to 1 instead of the 16-tooth sprocket which gives a top gear of 5¼ to 1. They informed me they could not supply one, and that all their advertised performances were done on standard gears. However, at a cost of £1 5s. 6d., I got one made in Bradford. If it had cost double it would have been worth it. I can now run along up hill and down dale on top gear. On Pool Bank, near Otley, I ran from one-third to halfway up on top, and then sailed up easily on middle gear and throttle half open, whereas I formerly crawled up the last half on low gear.

Having ten days' holiday, from August 11th to the 20th inclusive, I planned the tour given herewith from the Michelin guide-book, which has proved itself to be invaluable.

## Arranging Spare Fuel and Luggage.

Thursday evening was spent cleaning the cylinder, grinding-in valves, and oiling all working parts. After reassembling, the engine started up at the second kick after a petrol injection. One proof of the beneficial effect of lowering the top gear to 6 to 1 is that, although I had been running on 75% white spirit for some weeks and had done just over 1,000 miles, there was only about the same amount of carbon deposit as I previously had in 500 miles with pure petrol, and, but for the fact of the long tour we were taking, I should not have decarbonised.

I had four gallons of white spirit packed in one-gallon sealed oil tins put in a wooden crate and despatched by goods train to Torquay, and the same quantity to Southampton. On a large luggage grid made of three-ply wood, arranged to fit on the extended chassis of the Sunbeam sidecar, I had four one-gallon tins of petrol and two of blended spirit. These tins were wrapped in felt and each one tied separately, and on the top of this was a large case of luggage, so that we never had so much as a rumble from the tins.

Under the sidecar seat were three sealed tins of mixed spirit, which lasted us until we got to Exeter, when it became necessary to get a tin from the luggage grid. The tank, of course, holds close on two gallons, and in addition we carried a large suit case, which we can just fit inside the sidecar.

Saturday morning, August 11th, at last arrived, and at ten minutes to eight we set off through Wakefield and Barnsley. The roads were bad, and it was deemed advisable, having such a large quantity of unsprung luggage, to run at eighteen miles an hour instead of twenty until we got through to Sheffield. We went out by the Abbeydale Road, through Dore and Totley; here the roads were in fine

## THE ITINERARY.

*FIRST DAY.*—Bradford, Sheffield, Matlock, Belper, Derby (lunch), Burton, Lichfield, Birmingham (meet brother), Bromsgrove, Droitwich, Worcester, Tewkesbury, Gloucester, Stroud. 181 miles.

*SECOND DAY.*—Stroud, Nailsworth, Bath, Wells, Glastonbury, Taunton (lunch), Wellington, Cullompton, Exeter (meet brother), Chudleigh, Newton Abbot, Torquay. 129 miles.

*THIRD DAY.*—Spent around Torquay.

*FOURTH DAY.*—Torquay, Teignmouth, Dawlish, Exeter, Lyme Regis, Bridport, Dorchester, Bere Regis, Poole, Bournemouth, Christchurch, Lyndhurst, Southampton. 138 miles.

*FIFTH and SIXTH DAYS.*—Spent around Southampton.

*SEVENTH DAY.*—Southampton, Winchester, Basingstoke, Wokingham, Bracknell, Windsor, West Drayton. 68 miles.

*EIGHTH DAY.*—West Drayton, Windsor, Twyford, Reading (hospital call), Goring, Wallingford, Abingdon (hospital call), Oxford, Brackley, Towcester, Northampton, Market Harborough. 117 miles.

*NINTH DAY.*—Market Harborough, Leicester, Loughborough, Nottingham, Ollerton, Worksop, Doncaster, Wakefield, Bradford. 122 miles.



**A Thousand Miles Tour in Nine Days.**

condition. After a fine climb up over the moors, from which we got a magnificent view of the surrounding country, we put the gear into neutral and free-wheeled something like two miles down into the village, thence on and through the grounds of Chatsworth House.

This was our first stop, and after watching the graceful deer and admiring the distant view of the mansion, we emptied one of the tins of spirit into the Sunbeam's tank. We then had a fine run through Matlock and Matlock Bath on to Derby, arriving there at 12.15, just fifteen minutes behind our programme time. Leaving there at one prompt, despite a strong head wind, we ran straight through Burton-on-Trent and Lichfield to Birmingham, arriving at 3.5, having done the forty miles in two hours and five minutes without once changing from top gear.

We had arranged to meet my brother at three o'clock. Although living in Birmingham, he was fifteen minutes late, his excuse being, "I thought you would be delayed by the head wind and dust." After a cup of coffee for ourselves and another gallon of spirit for the Sunbeam, we started off at four o'clock. It rained for a few minutes, but soon stopped. From Birmingham until one gets a few miles past the Austin motor works the roads are in a terrible condition, and we had to run very slowly. By the time we got to Bromsgrove things were much better, and from here on through Droitwich, Worcester, Tewkesbury, and Gloucester to Stroud, the travelling was excellent.

**The First Night's Stop.**

At Stroud, it being now 8.30, and having done 181 miles, we decided to stay the night.

On Sunday morning I filled the Sunbeam's tank with another gallon of spirit, and on examining the tyres found a cut in the sidecar cover, through which I could see the inner tube. Needless to say, I soon had the cover off and put a strong canvas patch inside. At 8.30 we started on our journey to Torquay, 129 miles away.

At Nailsworth we had a long climb out of the valley, but this the Sunbeam did well on second gear; then followed a fine run on to Bath, another climb, and a long succession of up and down grades. Just outside Wells the sidecar cover was punctured by a large nail. This delayed us about ten minutes, but we were soon spinning along through Wells, Glastonbury, and Taunton, arriving here fifteen minutes behind the time mapped on our programme. After lunch we replenished the Sunbeam's tank, and set off at 2 p.m. for Exeter, which we reached at 3.45, going through Wellington and Cullompton.

After leaving Exeter we had a long, stiff climb up over Haldon Hill (I think it is called Telegraph Hill).

It was the longest and steepest hill we had come across so far, and for the first time since we left Bradford we had to change down to low gear about threequarters of the way up. Had we been running on pure petrol, I believe the Sunbeam would have taken us straight up on second gear. Onwards we had a magnificent run over the moors, which were purple with heather, through Chudleigh and Newton Abbot to Torquay, arriving at five o'clock.

**Climbing Trow Hill.**

On the Monday we had a walk through the woods down to Anstey's Cove, spent an hour on the water, and then wandered over the Downs and down the cliffs to Oddicombe Beach and Babbacombe. After dinner we brought the Sunbeam out and visited various parts of the town in which my boyhood days were spent.

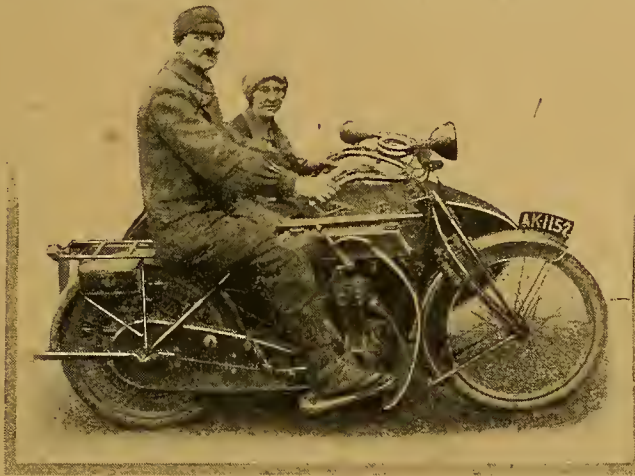
Leaving Torquay at 9 a.m. on Tuesday, we set off through Teignmouth and Dawlish for Exeter. For the first few miles the hills were very steep, but we accomplished all on second gear.

After leaving Exeter for Lyme Regis, we had to tackle several severe gradients one after the other, but they only served to increase our confidence in the capacity of the Sunbeam to climb anything in reason. After a while, we came to the celebrated Trow Hill, and went up to the last bend without a falter, and then I began to wonder whether we could succeed. The back tyre was a perfectly smooth-treaded Bates, and the

road surface for quite fifty yards was composed of greasy red mud. The back wheel began to spin, and after hesitating for a few minutes, which seemed like hours, it finally began to bite again, and after sliding about fifty yards we got on to *terra firma* once more and off we went.

From Trow Hill we had a fine run on to Lyme Regis. After lunch on the sea front, we climbed out of Lyme Regis on second speed, and went on through Bridport to Dorchester. Thence through Bere Regis we made our way to Poole, rode through Poole Park, and on to Sanbeds. What a fine spot this must be for a summer holiday! The breeze off the sea was delightful. We had just started off again when, with a loud report, the sidecar tyre went for the second time. I soon had it repaired so that it would take us on to Southampton, but at Bournemouth I purchased a spare Dunlop to put on the next morning before starting. I should say that the sidecar cover was put on at Easter. It was a clearance cover, and cost only 10s., and I had a new one at home waiting to put on, but thought we should just manage to get through.

We arrived at Bournemouth at 4.50, where we had arranged to have tea with friends. Leaving here at 7 p.m., we arrived safely at my father's home in



The writer of the accompanying article and his wife in the  $3\frac{1}{2}$  h.p. Sunbeam that served them so faithfully.



**A Thousand Miles Tour in Nine Days.—**

Southampton at 8.30, having had a delightful run through the New Forest.

On Friday morning we were up early and took the morning boat to Cowes. It would not be amiss before the next T.T. race to persuade the directors of the Isle of Man Steam Packet Co. to pay a visit to Southampton and see how things are done there.

From Cowes we cut across to Ninon Point, and thence worked our way round the coast to Ventnor, and so to Shanklin for lunch. After a look round here, we made our way through Sandown and Ryde back to Cowes, just in time to catch the four o'clock boat to Southampton.

On Saturday, at two o'clock, we set off for West Drayton, near Windsor, to spend the night with my brother-in-law.

We had a fine run after leaving Winchester through Basingstoke. What a glorious stretch this seventeen miles is! Then on through Wokingham and Bracknell, arriving at West Drayton at 5.30, having accomplished sixty-eight miles with one stop of five minutes.

The next morning, Sunday, we set off promptly at 9.45 through Windsor to Reading, and arrived at St. Luke's Hospital at 11.20, where I had arranged to see one of our Sunday School boys who had been in hospital some months and was expecting his discharge. After giving and receiving various messages, and enjoying a smoke, we left our young friend at twelve. We now made our way by the river side, through Goring and Wallingford, for Abingdon. No one here seemed to know where Burcoates House Hospital was, so we rode to the Abingdon Hospital. There the matron told us we had passed it six miles before reaching Abingdon. Retracing our steps, we

found a second patient delighted to see us. Leaving Abingdon, we were soon at Oxford, and then went on to Brackley, where we had tea. Then through Towcester and Northampton to Market Harborough, where we put up for the night at 8.30. On Monday morning we left Market Harborough at 9.15, and ran through Leicester and Loughborough to Nottingham.

From Nottingham we took the Mansfield Road and then cut off to Ollerton, through the Dukeries and Worksop to Doncaster, arriving there at 2.30. After a meal, we left Doncaster at 3.30.

**A Satisfactory Machine.**

At 8.15 the Sunbeam was safely garaged for the night, having run slightly over 1,000 miles on five gallons of petrol and thirteen gallons of white spirit. The only trouble had been the two punctures in the sidecar cover. Had I fitted a new one before starting I do not think we should have had to stop for even that. The Clincher de Luxe on the front wheel and the Bates extra heavy on the back were not touched. The Bates, of course, has numerous cuts and gashes, but I am sure will run at least another 1,000 miles.

Many of my friends said it was impossible to arrange a timetable such as the one I drew up. Yet we were never more than twenty minutes out anywhere, apart from our running beyond Burcoates Hospital by mistake.

The Sunbeam is absolutely reliable. I have the original chains still running after 9,000 miles, and on measuring with the spare one I have always carried I find the long chain has stretched only a quarter of a link. In pre-war days with belt drive I used to use six belts a year. The only alteration made to the Amac carburetter was to fit a fine gauze in the induction pipe.

G.W.B.S.



Passing through a typical Oxfordshire village.



# LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Herford Street, Coventry, and must be accompanied by the writer's name and address.

## ORIGINALITY IN MOTOR CYCLE DESIGN.

Sir,—Concerning the article in last week's number on the Big 4 Norton, I think the fact that a decompressor is not fitted to this model shows the lack of originality prevalent in the Birmingham school of motor engineering. London, Bristol, and the Bradford district produce the most original machines, and do nearly all the pioneer work.

To the London district we owe the A.B.C., Zenith, and the Blackburne. In Bristol, Messrs. Douglas, after a long and uphill battle, have established the flat twin in the motor cycle world.

The Blackburne has given the single-cylinder machine a new lease of life, in the face of its rivals, the flat and V twins. To the P. and M. we owe the decompressor; to the Scott the twin-cylinder water-cooled two-stroke and the open frame—the frame of the future.

Usual disclaimers.

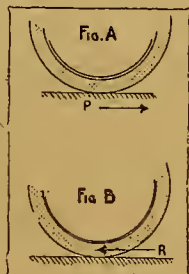
J. W. MATHEWS.

## ACTION AND REACTION ARE EQUAL AND OPPOSITE.

Sir,—I trust that the following explanation *re* action and reaction will solve the difficulty raised by your correspondent, Mr. Rae, in your issue of August 16th.

In fig. (a) we see the state of affairs from the road's point of view, which, as has been stated, is that the road experiences a backward force P. Fig. (b) shows the force acting on the wheel, namely, the forward reaction R. The important point to notice is that although the reaction R is equal in magnitude to the action P, yet the wheel is acted on *only* by the reaction R. The action P expends itself on the road, and does not interfere in any way with the effect of the reaction in pushing the machine forward.

MOHANDIS.



## THE SINGLE V. THE FLAT TWIN.

Sir,—In *The Motor Cycle* of July 26th last appears a most interesting letter by "Road Officer" on this subject. May we—two Wireless Section officers, whose means of transport is the motor bicycle—be allowed space in your paper to endorse heartily the opinions of "Road Officer," and to give a few of our experiences in order to support our views?

Both of us were enthusiastic motor cyclists long before the war, and both have owned various types of machines, including singles, V twins, and flat twins. Our experience out here includes six months' winter riding on the Somme, over mud tracks, further forward than the "roads" which even D.R.'s have to tackle.

At this time we had in the section two flat twins and one single, all of the well-known W.D. type. All three machines were comparatively new, and were well cared for. The flat twins were entirely unsuitable under these conditions. They would frequently "konk" to a standstill, on low gear, and on the level, simply from lack of power to plough through the mud. Probably a lower gear and greater clearance between tyres and mudguards would have helped matters; but even then the fact would still remain that these little engines are under-powered for such heavy work, and have to turn over at a high speed on low gear for miles on end. This inevitably spells overheating and rapid wear.

For real hard work under these conditions—which none could imagine without actual experience—the small flat twin as we know it to-day is not a success, in our opinion.

We now have five singles and no twins, thanks to the good offices of our supply column. One of the twins broke its frame completely, and the other was exchanged for a single owing to a badly twisted frame. Neither machine had seen six months' road service, when it was "cast."

And what of the singles? Their behaviour has been beyond praise. Never once have they let us down; never failed to plough their way through the worst mud, and even when dripping with slush and water from the tank downwards; never a misfire.

On really good roads—we scarcely know these, riding in the forward area—the flat twin is probably slightly more "silky," owing to its excellent engine balance; but on bad roads the heavier machine holds the road better, and is far more comfortable.

But cannot we settle definitely this question as to which is the better type of engine for really heavy work, the 2½ h.p. flat twin or the 3½ h.p. single? Through the medium of your paper, we think overwhelming evidence could be produced in favour of the single, from those who have handled both types of machine in the most severe reliability trial ever held.

We do not know how many D.R.'s there are out here, but their names must be legion. From our own observation, it would seem that a large percentage read *The Motor Cycle*.

We suggest, then, that any D.R. who has ridden both types of machine, in the forward area, and who has had at least six months' riding experience on any front, should address to the editor a postcard, bearing the inscription "Single" or "Flat twin" to indicate his choice of machine for all-round work on active service.

At a date, to be named by the Editor, the number of "votes" on both sides shall be published in *The Motor Cycle*. Surely this is a fair "poll." Will you undertake it, Mr. Editor? The result should be interesting and instructive, and we hope that every D.R. who reads this letter will send his postcard.

TWO R.E. LIEUTENANTS.

B.E.F.

[We shall be pleased to fall in with our correspondents' suggestion and to publish the result of the votes given to each type two months hence. Every postcard must be duly signed.—Ed.]

## PETROL ECONOMY.

Sir,—Having read in your issue of August 23rd the letter of "Disgusted," may I say I have been treated in exactly the same manner? I twice applied for a permit for two gallons a month for three months, but was refused on both occasions for the same reason as "Disgusted."

I am in a small business doing work of national importance, which I pointed out to the Petrol Control Committee, and while I am working at my trade, my workshop facing the main road, I see a great number of cars, packed with luggage inside and out, and ladies and gentlemen inside, off in the direction of the seaside on pleasure bent for the week-end. Sometimes a Red Cross car contains the owner and his wife and luggage off for the week-end. One week-end I met a car marked Squadron No. 3. This also was loaded with what appeared to be a week-end party.

I ceased using my motor cycle for some time, then I found it would be a benefit to me to use it, so I applied for a petrol permit, which was refused, and after taking out a driving licence I only drove about six times in the year, but I shall not renew it until such times as I am able to use it more.

SUSSEX.

Holmwood.



### THE SMALL V TWIN.

Sir,—What has the light V twin done that it should be left out of the flat twin controversy? I mean the 3 h.p. or 3½ h.p. type. After a varied collection of singles, flat twins, and large V's, I fail to see in what respect it is excelled for the soloist for that very smooth running that is claimed by the flat twin owner. A. G. PEMBERTON (CARR.).

### THAT HOT SPOT.

Sir,—Re "Chinook's" query. The fact of the underside of the piston being made up with carbon very quickly should supply the answer. If "Chinook" were placed in an iron room immediately adjacent to a similar room in which a roaring furnace was situated he would quickly realise where crank case heat comes from—if he survived! Oh, those experts! J.W.

### PETROL WASTE.

Sir,—We get very frequent visits from airmen. They travel fifteen to twenty miles over very hilly country in big lorries, large cars, and motor bicycles; on Sundays and week days they come, but always in fine weather.

It is said "here" that petrol is used "there" to wash the greasy clothes in.

Why this waste when business people are so very strictly limited and have to resort to all sorts of dodges to keep their machines running at all? FAIR PLAY.

### HOW TO HIT A COW.

Sir,—I see "Ixion" has given a little advice on how to hit a dog; I should like to add a few tips on hitting a cow. Do not grip the handle-bars and steer straight, or you will return home by ambulance.

The best way is to put the wheel over to the side you wish to be thrown. By doing this, and falling over on that side, you will be shot clear of the cow, machine, and handle-bars when the cycle strikes the beast.

As riders should hug the side of the road when passing cattle one can usually land on a grass patch—but it is as well to be insured. NINE LIVES.

### AVERAGE SPEED.

Sir,—I have just read "The Critics" on "Average Speeds" in your issue of July 19th. Over-estimation of speed runs back, in my experience, to the earliest days of the bicycle; and I expect that even the Celeres—the fast men of Roman days—when they pulled up at the Corona et Anchora for a beer—or was it ambrosia they drank?—told the same tough yarns about their chariot averages. I can imagine the old landlord hitching up his toga in disgust, and growling in an undertone, "*Humanum est errare*." There, those are about all the Latin tags I know; and having more or less successfully worked them in, I wipe the perspiration off my heated brow and proceed. Sailing under no false flag, I at once acknowledge my nationality—Australian, which takes me back in spirit to the other side of the world, to that great land where the sun shines and shines, while we sweat and wish to goodness it would rain.

In the early days of the Coolgardie goldfields I was a bicycle express rider. In those days there were no telegraphs on the goldfields, and the bicycle was the only medium of rapid communication between the various centres. The pay was big, and you can guess we rode long hours.

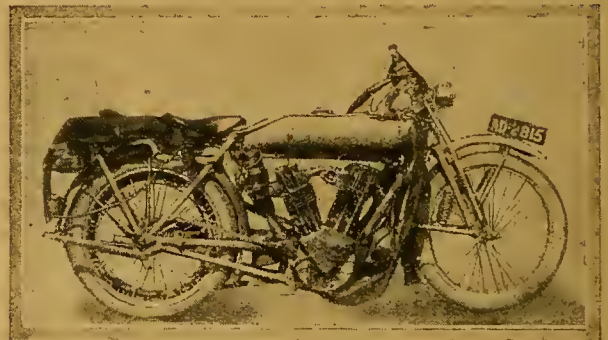
One day, when at the top of my form, swinging along a winding camel pad, I had running through my mind some of the yarns (complimentary term) that had been told me by other riders about their average speeds. My machine—a Humber racer, 91in. gear and 7in. cranks—was the best procurable; and being fitted with a cyclometer, I determined to test the statement of one man, who said he had averaged twenty miles an hour for four hours over bush tracks. Taking the time by my watch, I stuck to it as hard as possible, and made 19½ miles in the hour. I knew then that man had lied, and ever after listened coldly to "average" stories. I had my first motor cycle in 1897, and since that long-past year I have ridden and sold many makes. The "average" yarns grew with the increase of motor cycling to impossible altitudes, until the ordinary road riders were beating the road racing men—with their mouths. A little sprig of a curate came into my garage one day with his roadster Triumph, and told me he had averaged 50 m.p.h.

from Northam to Perth, a twisty mountain road. The best racing average is 46½ m.p.h. for the same road.

However, let us dismiss the "average" fiend—from this letter, at least. Let me tell you a car-story which, without having much point, will at least illustrate how careful a man should be with noughts. Discussing with a chauffeur one day the subject of ground clearance necessary on our roads, I ventured the opinion that 9in. was ample. He scoffed at this, and said, "I ought to know better than you, for I have driven more thousands of miles than you have hundreds." I replied, "Well, I have driven about 50,000 miles, so that puts you up to half a million. Do you still stick to it?" He left in disgust. MULGA.

Harrogate.

Sir,—Reading the paragraphs on average speed which have appeared lately in your paper, I thought I would let you know my experiences. To begin with, I have an 8 h.p. Bat with overhead valves, which is an ideal mount for speed work. My fastest long distance was—at an average, including stops, of just over 40 m.p.h.—125 miles in 3h. 5m. The



The 7-9 Bat-Jap to which the writer refers.

road was fair from Birkenhead to Cheltenham. As regards short runs, I have brought a ten and a half stone passenger on the back from Shrewsbury to Oswestry, a distance of eighteen miles, in 20m. This was on a very good road. Other runs are forty-three miles in 55m., twenty-four miles in 29m., and nine miles in 10m., from Oswestry to Birkenhead, Cheltenham to Worcester, and Cheltenham to Tewkesbury respectively. Thus as the distance increases the average speed goes down. I can get 70 m.p.g. on country runs, and about 60 m.p.g. on short runs. The machine will paddle off warm on 3½ to 1 gear, and from cold after injection, and will do about 75 m.p.h. on the same carburettor setting. May I add I have no interest in Bats, except as a satisfied user? AD 2815.

Oswestry.

Sir,—I was very interested in G. Wilkinson's letter in *The Motor Cycle* of August 23rd. I should like to inform your readers of a somewhat similar journey on a 1914 3½ h.p. N.U.T., overhead valves, fixed gear of 3½ to 1. In my opinion, thirty miles can be easily maintained. Last September I went from Didsbury (Manchester) to London (181 miles) in 5 hours 35 mins., with only one stop to repair a puncture, which took me 15 mins. The actual riding time was 5 hours 20 mins. I did not stop for any refreshments on the way. The average speed, including stop, was 32 m.p.h. The return journey was accomplished absolutely non-stop in 5 hours 15 mins., which averaged out at 34½ m.p.h. The machine went splendidly the whole journey; the petrol consumption was equal to 95 m.p.g. (the tank holds a little over two gallons, so I had no need to replenish on the road). The machine at that time had to its credit a matter of 15,000 miles, and had had no replacement of any kind. This journey was not a mere flash in the pan, as I used to go regularly from Didsbury to Blackpool, via Bolton and Preston, a distance of 54 miles, in 1 hour 40 mins.—32½ miles per hour, and over Lancashire roads, which, as everyone knows, are vile. No matter on what journey I go, I always estimate to equal thirty miles per hour. The machine, although used rather roughly, has now about 25,000 miles to its credit, and is receiving its first overhaul since new.



These few instances show that a well-tuned machine is quite capable of doing good speeds. Not many horizontal twins of  $3\frac{1}{2}$  h.p. can show much better records; not a replacement in 25,000 miles or a single bearing renewed. I myself am no lightweight, scaling somewhere about 12 st. 10 lb. Usual disclaimer.

R. M. WHITEHEAD, SEC.-LT. R.F.C.

#### EXCESSIVE CHARGES.

Sir,—I recently required some new pinions for a well-known three-speed hub gear, and invited quotations from two firms who advertised that any gear parts could be supplied from stock. The two quotations differed very little, but appeared to be excessively high, so I asked the makers for a quotation, and soon received a *pro forma* invoice, which showed the other quotations to be 125% and 150% in advance of the makers' price, which was 33 $\frac{1}{3}$ % in advance of pre-war price! It is time this profiteering in the motor cycle trade was stopped, and the firms shown up.

AWAKE.

Gainsborough.

#### BENZOLE AS A MOTOR FUEL.

Sir,—I notice in your issue of August 23rd a letter by "F.E.S.," asking for the freezing point of benzole.

Benzene (*i.e.*, the pure compound forming the bulk of benzole) has a freezing point of 0°C. This property is made use of in the purification of benzene.

I have myself experienced trouble in winter by benzole freezing, but this can be eliminated by the addition to the benzole of higher boiling point compounds of the same series, such as toluol or solvent naphtha.

The freezing point of petrol is far below natural temperatures obtained at any time in this country.

L.A.S.

Knottingley.

#### PILLION RIDING.

Sir,—In your issue of August 23rd I notice a further reference to pillion riding, concerning the added responsibility of the driver in the event of a smash. It is just because of the slight additional risk, when the necessity for rapidly swerving arrives, that, in a recent communication, I strongly advocated that the passenger should sit as close, in reason, to the driver as the pillion seat will allow, passenger to be lighter in weight than the driver, and the former to retain a firm grip of the latter's belt, which should be tightly adjusted. The risk, if any, will then be reduced to a minimum; also it will be found that the added weight of a passenger will actually steady the machine when travelling.

VIC.

Golder's Green.

#### SIDECAR V. RUNABOUT.

Sir,—Why a light three-wheeler should not be vastly superior in every respect to a big twin sidecar outfit, I absolutely fail to see. I will not go into details of design, but, with the same engine, gear box, and transmission as, say, the A.J.S. combination, built into an underslung ash chassis, supporting a sporting three-ply wood body, I think a three-wheeler would be a huge success.

I have often approached my friends about such ideas, but have always met with the same old rebuffs. The chief prejudices seem to be:

- (1.) Ugliness on account of three wheels.
- (2.) Inaccessibility of back wheel.
- (3.) Air-cooled engines would overheat owing to the sheltered position.
- (4.) Three-wheelers shake to pieces.

A word or two on the above faults.

(1.) It does not seem to occur to sidecar owners prejudiced against three-wheelers that sidecar combinations are also three-wheelers of a kind. "Oh! but that's different," they say. It is candidly admitted that the sidecar combination is the ugliest and most unmechanical modern passenger vehicle on the road. In my opinion, a Morgan is far more pleasing to the eye than any £120 sidecar combination.

(2.) An A.C. Sociable back wheel is just as accessible as, if not more so than, the average motor cycle back wheel. Surely it is a comparatively simple thing to design a quickly detachable back wheel for a three-wheeler with hinged back mudguard.

(3.) If an air-cooled engine is a success in the modern heavy combination, with its broad front mudguards causing almost a vacuum wherein the cylinders must disperse their

heat, it stands to reason that the same engine in an open bonnet, with nothing to obstruct the air, must be a success also. Of course, I am taking it for granted that the running conditions are practically the same, and that the ratio of weight to power is also identical.

A vehicle that is built up as a complete unit is far superior to a motor cycle and sidecar. There is far more risk of sidecar couplings breaking than chassis members on a properly designed three-wheeler.

There are heaps more advantages suggested by "More Comfort," and I hope his letter will at least stir up conventional manufacturers' ideas. I do not blame manufacturers so much, because undoubtedly it is a big risk to attempt to compete against the sidecar market as it stands to-day, but nevertheless the Scott people have evidently thought it worth their while to do so. I do not think they will be disappointed.

I am fortunate enough to receive *The Motor Cycle* regularly, for which favour I am indebted to a fair, blue-eyed flapper, whom I hope some day—but I'm not telling everybody!

Just one more point. My companion D.R.'s and myself enjoy your military notes immensely, and there is an eager grab from all sides when the old blue cover reveals itself from out of its wrapping.

(L.-CPL.) L. S. COMMON, A.S.C., M.T.

#### SPARKING PLUG DESIGN.

Sir,—I have been following with great interest the correspondence you have published on the above subject from time to time. From all the letters you have published, and from my own experience, I think that there are now only two points in plug design about which there can be any doubt. They are: (1) What temperature should a plug be allowed to reach whilst working? and (2) should a plug be of the single or multi-point type?

To my mind, "A.W." fully explains the fact that, so long as a plug does not get hot enough either to damage its porcelain insulator or burn its points, it is not too hot. As to whether a plug should be single or multi-pointed, your correspondents seem to differ in opinion.

I always favour the single-point plug myself. My one great reason, that I have not yet seen advanced by any of your correspondents, is this. When a point receives a high voltage electrical charge, such as does the central electrode of a plug, before the gap can be broken down and the spark occur, an electrical discharge takes place from the point to the nearest earth. Now if a plug has one insulated electrode and, say, three earthed electrodes, there are three paths for this discharge to take, and it has been proved by experiment that it does not only take the shorter or easier path, but all of them, just as an electric current will flow through three or more wires connected in parallel, even if their resistances are not the same. Now if we take a plug with one stout insulated and one earthed electrode, there is only one path for the discharge to take. The discharge from the one point will be greater than that from any of the three mentioned above; but this helps to break down the gap sooner, and so there is not so much of the charge lost, and the result is a much fatter spark.

This difference in the spark can often, although not always, be seen, by first noting the spark with a multi-point plug and then that with a single-point plug, using the same magneto in each case.

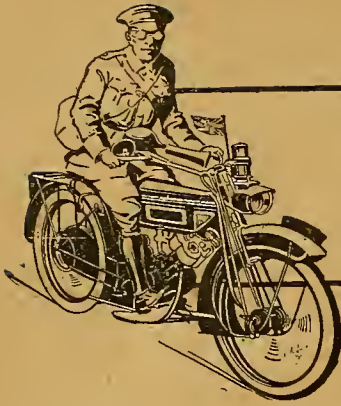
I have myself tried this with magnetos and some of the latest types of American coil and accumulator systems, and find the difference more pronounced with the coil and accumulator than with the magneto.

I have tried many makes of multi-point plugs, but have always been glad to get back to the single-point again, and, in fact, have often cut the points off plugs to make single-point ones of them, and now I have several single-point plugs that were sold at 3s. 6d. each before the war that are still going strong after two years' hard work; also some of them have been working in engines that had nothing but steam in the water jackets when the water pump has broken down.

These observations have not been made on one or two cars, but on a whole convoy of cars, the ignition systems on which I have been looking after for some considerable time, so I have had every opportunity of looking into such things as plug trouble, and now I would not thank anybody for offering me a multi-point plug.

R.D.H., A.S.C., M.T.





## D.R.'S AND THEIR WORK.

(IN FOUR INSTALMENTS)

PART IV.—TYPES OF MACHINES. By D.R.

THE best type of machine undoubtedly for a D.R.'s work

is the mediumweight three-speed single, though for certain classes of work the two-speed lightweight horizontal twin is very suitable. There is no need for the high-powered twin. The single is simple and reliable, and quite fast enough (where the roads permit any speed) for any ordinary despatch work. The lightweight is very handy for pottering about over short distances, and it can easily be lifted over impossible places if necessary. Two or three-speed gears are absolutely necessary for some kinds of work, but, unfortunately, these are very frequently used more as a luxury. The low, wide handle-bars on any type of machine have come to stay—at least as far as the D.R. is concerned—though some manufacturers were very loth to adopt these as standard. Plenty of clearance between wheels and mudguards and stays and forks is of more importance than auxiliary mud shields when D.R.'s nearly always wear overalls. Front spring forks, though not all quite perfect, are about as good as we can get, but a perfect rear springing device would be welcomed by D.R.'s.

### Care of Motor Cycles.

Some D.R.'s machines are really well cared for and used in the most economical manner possible, but the abuse of other machines is most deplorable. I have seen machines left standing all night outside billets on the public footpath in the rain, simply because the riders were too idle to leave them in the M.T. depot and walk half a mile in the evening. Very much unnecessary wear and tear is caused through lack of a little attention in the way of adjustments, lubrication, etc.

The *misuse* of the clutch and variable gear is also responsible for a lot of unnecessary strain and wear and tear on machines. No doubt the clutch and variable gear are essential for some kinds of work, but these are used almost at all times when quite unnecessary. Only the other day I watched a young rider on a brand new Government machine coming up a slight gradient. He pulled up suddenly outside the post office in about five yards, probably to demonstrate how effective his brakes were. His business finished, he started the engine after two or three kicks, and took about three or four minutes to arrange himself gracefully, light a "gasper" and pull on his gauntlets, while the engine was racing the whole time. I naturally thought that he would continue his journey *up* the hill, though the gradient was not stiff enough to prevent an ordinary running start on top or middle gear. But no, he let in the clutch and *jerked* away in

low gear, only to turn round and go *down* the hill after all. It is nothing to see D.R.'s standing for several minutes at a time talking to pals while their engines are running the whole time, causing unnecessary wear and tear and fuel consumption. Such losses as these may seem very trifling when considered separately, but, if these practices occur with some hundreds of machines several times a day, the total wastage must be enormous. I do not for one moment suggest that this loss could be prevented altogether, but I say that it could be very considerably reduced.

### Sidecar Possibilities.

An ordinary passenger outfit might often be used for carrying officers on their duties instead of the heavy luxurious touring cars. A sidecar ambulance for one or even two stretchers might often be used instead of the large heavy ambulance vans for conveying some of the less serious cases to hospital. The commercial box carrier, as now being used so successfully at home by tradesmen for delivery purposes, might well be used for carrying light loads of up to 4 cwt. Indeed, the usefulness of these box carriers in the Army would be almost unlimited, and it is surprising to many that they have not been more generally adopted. They present what is probably the cheapest possible means of road transportation, and in many cases might even supplant the light lorries used. One frequently sees quite a junior officer as the sole passenger in a most luxurious Government car, while his journeys could be covered just as quickly in a sidecar and at a fraction of the cost. I know of a large ambulance van covering 160 miles for a single case for the hospital. The invalid was quite well enough to walk, with a little assistance, across country to the ambulance, which *had to wait* at the railway station from which frequent trains travelled almost to the hospital door.

Outside military camps and barracks one sees heavy horse transport waggons and motor lorries travelling regularly to and from the nearest station or supply depot two or three times a day. Except for the ration supply of one journey a day or when drafts are moving, the average load rarely exceeds 2 or 3 cwt. The commercial sidecarrier would effect a great saving in time and expense for this kind of work.

### THE NEED FOR PAPER ECONOMY.

The only way to ensure regular receipt of this journal is to place a definite order with your newsagent or the publishers.

*This action will enable newsagents to limit their orders to the actual number of copies required, and so effect a saving of paper, labour, and railway transport.*



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## The Age Limit.

**Q.** (1.) I am under the impression that a licence for driving a motor cycle may be granted at the age of fourteen years. Is this so? (2.) Can I also drive a sidecar at this age, or am I permitted only to drive a solo mount?—B.D.

**A.** (1.) A licence for driving a motor cycle may be granted at the age of fourteen years. (2.) The type of motor cycle is not stated, therefore we assume that this applies to any vehicle registered as a motor cycle, including a sidecar outfit.

## Decarbonising.

**Q.** Would you be good enough to inform me if you consider the Cyclean process a good method of decarbonising a 6 h.p. twin-cylinder J.A.P. engine (Enfield)? I have been told that the extreme heat used is apt to distort and pit the cylinder.—P.H.

**A.** We believe the Cyclean process to be an excellent and perfectly safe method of decarbonising, though, of course, there is no way of doing this so thoroughly as by taking the engine adrift. The heat process merely removes the carbon deposit from the combustion head, the top of the piston, and the valve pockets, but it does not free the piston rings, which are generally improved by a little attention, nor does it clean the inside of the piston.

## Carburettor Choking.

**Q.** I should be glad if you would tell me what is wrong with my twin-cylinder motor cycle. It will not take open throttle, but will take the air about quarter way open. It will start all right, but will not continue to run. It slackens speed and then stops, but will pick up sometimes if I put my hand over the hot air intake. I have had the engine down, and fitted a set of new piston rings and new bushes. It consumes half a gallon of petrol for ten miles.—P.C.K.

**A.** Possibly the running of the engine will improve after it has been on the road a little longer and when the new piston rings and bushes have become run in. The symptoms which you describe seem to indicate that there is a partial stoppage in the petrol system, probably by air lock. On the other hand, the consumption is absurdly high, and we can only account for this by assuming a serious leak somewhere in the petrol pipe, at one of the unions, or that the carburettor is flooding.

## Running on Coal Gas.

**Q.** Will you be good enough to give me a little information regarding the use of coal gas as a fuel for my motor cycle? (1.)

Is the fuel suitable for a single-cylinder 4 h.p. engine with good reliability? (2.) What is the volumetric consumption for above engine (approximately), using coal gas, with a medium weight sidecar and passenger? (3.) What alteration to carburettor would be needed to give best satisfaction, and would other parts require alteration? (4.) Should I experience difficulty in starting with this fuel in cold weather?—G.H.F.

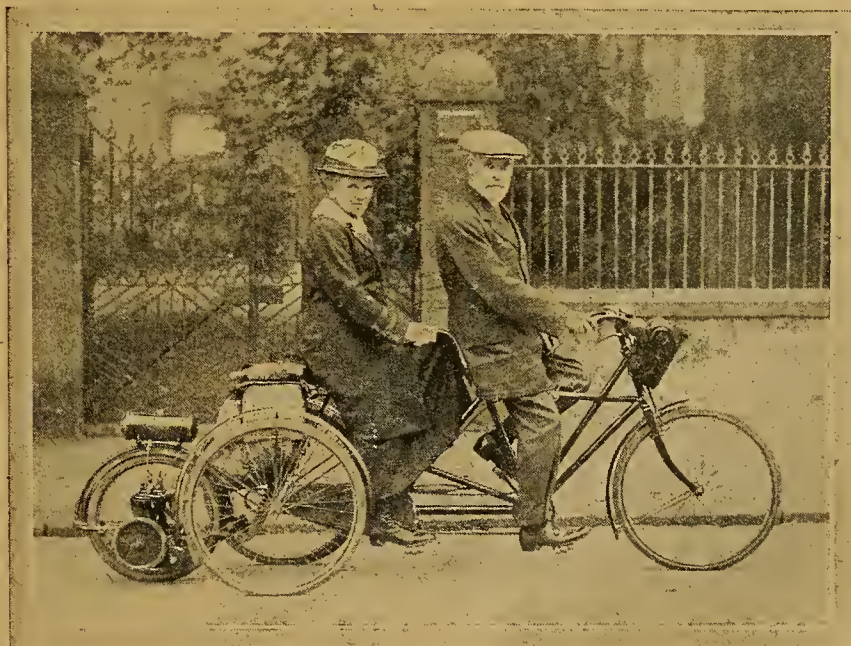
**A.** (1.) We do not think that the use of coal gas is applicable to motor cycles. Petrol engines will run on it, but they become much hotter than on petrol, and the difficulty lies in carrying a sufficient volume of gas aboard the machine. It is practically impossible to carry on a sidecar frame more gas than would take the machine approximately fifteen miles. (2.) About eighty-five cubic feet of coal gas are equivalent to one gallon of petrol.

(3.) We do not think any alteration will be necessary to the carburettor. It would simply be used for governing the air supply, and the coal gas could be taken in by a small pipe connection directly to the existing induction pipe. (4.) No, you would not be so likely to experience as much difficulty in starting in cold weather as with petrol.

## Pre-ignition.

**Q.** I have a 2½ h.p. Calthorpe-Precision. After the machine has run from one to two miles it gets fearfully hot. It uses a large quantity of petrol, and on opening the air lever past the throttle the engine misfires, and will only fire regularly when air and throttle are together, except when at a high speed, when the air lever can be opened a little. The jet is No. 30.—A.A.

**A.** We should recommend you to try another make of plug, as that which you are using may be causing pre-ignition. Also try the effect of a much smaller jet; experiment with various sizes until you get the best results. We presume the compression is normally good.



## A ONE-HORSE POWER PUSH.

The Auto-wheel is an adaptable little unit, and though, of course, much under-powered to propel a tandem tricycle, the owners find it a great help on their journeys. By its aid they can average twelve miles an hour with comparatively little exertion.



**For Sidecar Use.**

?

I have a 1912 single-gear clutch  $3\frac{1}{2}$  h.p. Triumph, and I want to fit a Watsonian or other lightweight sidecar; weight of two persons, 17 stone. Will the machine do it, and would fitting a Philipson pulley improve matters.—H.G.C.

We do not think you would find a single-gear machine with direct belt drive very well adapted to sidecar use, but the addition of a Philipson pulley would help matters immensely. You would probably obtain better satisfaction by selling your present mount and buying a good second-hand outfit, while the expense might be but little greater.

**A Flat Twin and Heavy Fuel.**

?

I should appreciate your advice with regard to carburation in connection with my 1917 6 h.p. flat twin. The machine has an automatic carburetter. This carburetter was satisfactory with petrol, but when I commenced to use substitute the engine would not accelerate from the slow tick-over obtained on the pilot; when the throttle was opened the engine would revolve a few times, misfire, back-fire in expansion box, and blow back through the carburetter; then it would stop. I increased the diameter of the choke tube, thinking more air would cure the disorder, but the results were worse; and even with pure petrol the engine performed exactly as with substitute. I then decreased the diameter of the choke tube till it was about 15% less than when the machine was delivered, and the engine accelerated fairly satisfactorily. Though the machine has since done 500 miles over rough Welsh country—including some short pitches of 1 in 5 and, I think, 1 in 3 (third gear) with heavy load—the acceleration is sluggish, and I have had machines of another type, but the same horse-power, go past me. Of course, if the other machines have petrol going through the carburetter instead of paraffin (as I have) I cannot expect to attain the same speed. I find that if I open the throttle too quickly the engine will not pick up (from pilot to main) satisfactorily, but misfires and blows back through carburetter; however, this does not occur when I accelerate slowly. (1.) Would you recommend me further to reduce diameter of choke tube (inside diameter)? (2.) Or would a larger jet be the better adjustment? (3.) As an alternative, I have been thinking of fitting an automatic multiple jet carburetter, which I found a very great improvement to my Scott. Could I expect better acceleration and more power and speed if I fitted one to my 6 h.p. flat twin?—A.S.L.

We have experienced the same trouble as you speak of with flat twin engines using heavy fuel, and we doubt very much whether you will be able to remedy it. To obtain a slow tick-over with paraffin or substitute is, we believe, almost impossible. (1.) This rather depends on your fuel consumption. If you are doing a good mileage per gallon

you might try the effect of still further reducing the size of the choke, but we would not recommend you to do this if your fuel consumption is heavy, as the liquid fuel would probably get past the rings and injure the bearings. (2.) The foregoing also applies to size of jet used. (3.) You would probably experience the same faltering with a multiple jet carburetter. It would be a good idea to lag the induction pipe and to fit an efficient hot air intake to the carburetter.

**Overheating and Knocking.**

?

(1.) I have experienced overheating and knocking on my 1916 T.T. Rover, and although recently dismantled it is almost as bad as before. Do you think this could be due to a choked silencer? It would seem that there must be a great deal of back pressure from this silencer, as the gas has to pass two complete right-angled corners, and so perhaps a slightly choked box would have the effect of giving more back pressure on this type than on others. (2.) Are these machines inclined to run unusually hot? (3.) The crank case release consists of a small hole through the centre of the Philipson pulley, air being alternately forced out and sucked in as the piston descends and rises. A large quantity of oil is constantly being forced out, making engine, machine, and rider's boots very oily. Can you tell me how to overcome this? I have drilled a hole between the tappet guides in the crank case, and have led a copper pipe to the underside of the crank case, but this is unsatisfactory, as the pipe gets choked up with dust, etc.—J.H.J.

(1.) It is almost impossible for this pattern of silencer to choke. The silencer is well designed, has an almost total absence of back pressure, and is one of the most efficient on the market, as was proved by the A.C.U. Silencer Trials in 1913. It is more likely that the trouble is due to too high compression, which may not suit the rather poor petrol we have at the present time, and may be cured by fitting a plate about one-sixteenth of an inch thick between the bottom of the cylinder and the top of the crank case. (2.) These machines are not usually inclined to overheat. (3.) This is a disadvantage of this pattern of relief valve. The trouble could be overcome by plugging up the hole and fitting a one-way relief valve to the

crank case, as you suggest. Your idea should be quite satisfactory, and we cannot understand why the pipe should get choked up as it does. Perhaps it has rather too small a bore.

**Cyclist and Motor Cyclist.**

?

Is it possible for a man to ride and become a good rider of a solo  $3\frac{1}{2}$  h.p. motor cycle without previously ever having ridden or learnt to ride a pedal cycle? Could he become as good a driver as one who has formerly been a cyclist?—S.W.

Certainly the good motor cyclist is rarely the man who has been an exceptional pedal cyclist. To learn to ride a motor bicycle, however, it is better to have begun on a pedal cycle, but the riding of the two is quite different, as the successful motor cyclist must have a thorough knowledge of his engine, should know how to get the best out of it, in addition to being able to keep a straight course and ride over difficult places. To begin with, an attempt should be made on an old machine, fitted with pedals and the drive disconnected, so that the balance of the two-wheeler may be acquired.

**RECOMMENDED ROUTES.****LEEDS TO THETFORD.—H.W.P.**

Leeds, Doncaster, Retford, Tuxford, Newark, Sleaford, Swineshead, Long Sutton, King's Lynn, Stoke Ferry, Mundford, Thetford. The distance is approximately 154 miles.

**BOURNEMOUTH TO ILFRACOMBE.—E.E.J.**

Bournemouth, Wimborne Minster, Blandford, Sherborne, Marston Magna, Langport, Taunton, Milverton, Wiveliscombe, Bampton, South Molton, Barnstaple, Ilfracombe.

**ONGAR TO CHESTER.—G.H.A.**

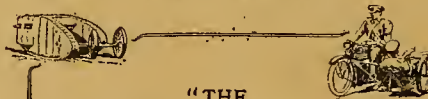
Ongar, Harlow, Hertford, Hatfield, St. Albans, Leverstock Green, Berkhamsted, Tring, Aylesbury, Bicester, Banbury, Stratford-on-Avon, Alcester, Headless Cross, Bromsgrove, Kidderminster, Bridgnorth, Wellington, Hednet, Whitechurch, Chester.

**NEWCASTLE TO LOWESTOFT.—R.D.F.**

Newcastle, Durham, Darlington, Northallerton, Boroughbridge, Wetherby, Aberford, Ferrybridge, Doncaster, Bawtry, Retford, Tuxford, Newark, Leadenham, Sleaford, Swineshead, Long Sutton, King's Lynn, Swaffham, Dereham, Norwich, Thorton, Beccles, Lowestoft.


**A Route to avoid Brentford.**

The following route from London on to the Exeter road is suggested by a correspondent. Instead of going through Brentford to Hounslow, the Uxbridge road should be taken as far as Southall, when turn to the left down South Road, over the railway, where turn right down North Hyde to Cranford, then turn right down the Bath Road past "The Berkeley Arms" to the first turning on the left to Bedfont, where the right-hand fork should be taken down the Staines road. The *détour* involves an extra distance of about three miles.



**"THE  
MOTOR CYCLE"**

**OBTAINED OVER 10,000  
RECRUITS VOLUNTARILY  
FOR THE ARMY MOTOR  
SECTIONS, INCLUDING THE  
FAMOUS TANKS. A LETTER  
OF APPRECIATION WAS  
SUBSEQUENTLY RECEIVED  
FROM THE  
ARMY COUNCIL.**





# THE "CADET."

They do put us through it; never since I left Marlboro' have I had to slog in as I have done lately: why, settling days on the Stock Exchange are nothing to it. Not having touched mathematics for years, the exams. seem a bit "up to you" at first; but I have learnt one thing—that all the wise ones smoke "Army Clubs." They're dinkie.

## "CAVANDER'S Army Club" CIGARETTES

20 for 11d. 50 for 2/3. 100 for 4/6.

*Sold by all the leading Tobacconists and  
at all the Canteens at home and abroad.*



# CHAINS!

You cannot do better than specify "The Coventry" Roller Chains when ordering your new mount or replacements. Our chains are designed for

## SUPER-SERVICE AND MAXIMUM MILEAGE.

Being engaged wholly upon War work, we can only accept orders accompanied by Ministry of Munitions' certificate.

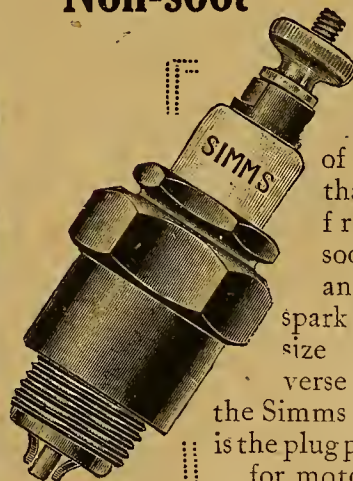
Head Office and Works—

"THE COVENTRY" CHAIN Co., Ltd.,  
COVENTRY, England.



E676

## Simms "Non-soot" Plug.



By reason of the fact that it keeps free from sooty deposits and gives a spark of ample size under adverse conditions, the Simms 'Non-Soot' is the plug pre-eminent for motor cycles.

Price, of all dealers, Single or Twin Points, 3/6.

And of the Makers—

**SIMMS MOTOR UNITS, LTD.,**  
Percy Buildings, Gresse Street, Rathbone Place,  
LONDON, W.1.



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd.**, and crossed **& Co.**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**ABINGDON** King Dick, 4h.p., 2 speeds, handle starting, fitted with lamps, horn, generator, and new tyre; £20.—Wellbry Motor Garage, Woodford Rd., Forest Gate. 'Phone: 309 Stratford. [7340]

### A.J.S.

**A.J.S.** Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

**A.J.S.** 6h.p. Combination (1913), speedometer, lamps, complete turn-out; £45; part exchange lightweight.—273, High St. North. East Ham. [7375]

**A.J.S.** 1914, 6h.p., 3 speeds, kick starter, Speedwell C.R. sidecar, in excellent condition throughout; £65.—Forbes, Ivy Walls, Stanford-le-Hope, Essex. [7317]

**1916** 2½h.p. A.J.S., 260, 2-speed, Lucas lamps, horn, speedometer, only done 3,000, new condition; consider late combination.—Lord, Mountfield, Prestwich. [X4800]

**A.J.S.** 4h.p., late 1915, in practically new condition, only done about 1,000 miles, with lamps and horn; £65, lowest price.—J. W. Jones, Sheephouse, Hay, via Hereford. [7358]

**A.J.S.** 1915, 2½h.p., 2-speed, kick starter, tyres new, F. and H. head lamp, rear lamp, generator, horn, pump, some accessories, machine perfect, plating and enamelling excellent; £42; seen by appointment. 'Phone 690 Dalton.—7, Sowerby Rd., Barking, Essex. [7480]

## Obviate—

fastener failings by fitting

## FORWARDS

They never fail, no matter what the work, strain, or tension put upon them.



PAT. No  
19495/09

The Forward, 1/6.



ROLLER BEARINGS

PAT. No  
1837/11

The King Hook.

Detachable ... 1/-  
Adjustable ... 1/3

## TEST THEM

That is what we ask you to do.

## FORWARD MOTOR CO.

35, Forward Works,  
Summer Row, B'ham.

## Petrol & Oil Tanks



Specialists in highest grade tanks. Satisfaction guaranteed.

Trade enquiries solicited.

A. GREEN, Water St., Blackfriars, Manchester.

Auxiliary tanks stocked in 3 sizes, with filler, tap, clips, T piece, and piping from 6/6.

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Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**1916** 2½h.p. Solo A.J.S., splendid condition, running order throughout, 3-speed, kick starter, tyres perfect, usual accessories, mileage 1,500; seen London; £45.—P., 19, Palace Gate, S.W. [7364]

**1916** 4h.p. A.J.S. Combination, clutch, kick starter, 3-speed, Miller head lamp, mechanical horn, good tyres, tools, spares; expert examination; lowest £85.—Box 1,196, c/o The Motor Cycle. [X4755]

**A.J.S.** 2½h.p., 1914, 3-speed, clutch, T.T. bars, P. and H. head lamp and generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.1. [7563]

### Alldays.

**COLMORE** Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796]

**RIDER** TROWARD and Co., 31 and 78, High St., Hampstead.—Alldays Allon, 1916, 2-speed, 2-stroke; 27 gns. (1) [7428]

**ALLDAYS** Matchless, 3½h.p., 3 speeds, countershaft, combination in nice condition; £38.—Percy and Co., 337, Euston Rd., London. [7570]

**ALLON**, new, 2½h.p., 2-stroke, single speed; £39/12; the stout-hearted lightweight; extended payments arranged.—Harrod Motor Showrooms, 118, Brompton Rd., London, S.W.1. [7472]

**ALLON**, 1915, 2-speed, 2-stroke, pan saddle, £39/10; single speed (new), £36; 2-speed, new, £42; 2-speed and hand clutch, new, £45; extended payments or exchange; Alldays Allon, 1915, 2-speed, Dunlop tyres, enamelling and plating good, £30/17/6.—Service Co., 292, High Holborn. [X4815]

**1916** ¼ Allon de Luxe, bought new, fine condition, 125 m.p.g., 2-speed, hand clutch, leg shields, massive P. and H. head lamp, electric rear, splendid tyres, 2¼in., spare torpedo tank, full tool kit, also single speed gear box, exceptional machine; £38; photograph.—Bradley, Tibberton, Gloucester. [X4745]

### Ariel.

**ARIEL** 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562]

**COLMORE** Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797]

**1917** Ariel, 3½h.p., 3-speed, decompressor, spring seat-pillar, brand new, not used; listed £72, price £65.—10, Bartholomew St., Ipswich. [7136]

**VERY** Smart Ariel, 3½h.p., 3-speed countershaft, lamps, Klaxon, tools; £50; with sporting sidecar; £54, bargain.—Reiner, 13, May Rd., Twickenham. [7397]

**ARIEL**, 1915, 3-speed, and clutch, 5-h.p., spring seat-pillar, Dunlop tyres, hood and screen, Lucas lamp and Conroy speedometer; £71/15; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4828]

**ARIEL** (new), 3½h.p., 3-speed countershaft gear, clutch and kick starter, decompressor, patent spring seat pillar; £72; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [7473]

**ARIEL**, 3½h.p., 1917, 3-speed countershaft model, clutch, kick starter, patent decompressor, spring seat-pillar, etc., only ridden 50 miles, spotless condition; owner suddenly called to France; bargain, £62/10.—25, Ormiston Rd., Shepherd's Bush, W. [7365]

**ARIEL** 1916 3½h.p. 3-speed Kick Starter Combination, speedometer, lamps, horn, easy starting device, original tyres still on, £72/10; also a brand new combination actually in stock, £95/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7416]



# MOTOR CYCLES FOR SALE.

## Auto-Wheels.

**AUTO-WHEEL.** what offers over £5.-57, Oakington Manor Drive, Wembley Hill, Middlesex. [7291]  
**AUTO-WHEEL.** B.S.A. (very little used), and Swift cycle, Dunlops; £10.—Batley, 44, Torridon Rd., Outford. [7361]

## Bat.

**BAT-J.A.P.** 6h.p. Twin, chain driven, 2-speed gear, kick starter, excellent sidecar, all accessories, splendid order; £35.—Matthews, Pawnbroker, W. Croydon. [7491]

## Bradbury.

**BRADBURY.** 1912, 3½ h.p., 2 speeds, chain drive, free engine; £25/10.—Motor Exchange, Horton St., Halifax. [7046]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Bradbury, 1914, 4h.p., 2-speed countershaft, coach sidecar, 39 gns.; 1912 single speed Bradbury, 16 gns. (D). [7429]

**BRADBURY.** 4h.p., wicker sidecar, 2 speeds and free Bosch mag. Binks variable, tyres and belt as new, good puller, splendid running, tools, lamps, horn; £30.—Hoare, Anna valley, Andover, Hants. [7535]

## Brough.

**1917 Lady's 3½ h.p.** Horizontal Brough, 3-speed, delivered by makers only 6 weeks ago; £65.—Miss Reid, Headroom, Fraserburgh. [X4714]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1916 Brough, 3½ h.p., 3-speed Sturmey countershaft, as new; 59 gns. (D). [7430]

**BROUGH.** 1916, 3½ h.p., H.C. model, with Grosvenor light sidecar, Sturmey gear, best accessories, done under 2,000 miles, original tyres, and scarcely marked, very carefully used; cost over £60, take £65.—Clapman, Chemist, Winterton, via Doncaster. [X4782]

## Brown.

**BROWN 3½ h.p.** Motor Cycle, enclosed mag., spring forks, Brooks, wants tuning; £12/10, offers.—Rev. Ball, 49, High St., Kingston-on-Thames. [X4538]

## B.S.A.

**B.S.A., 4½ h.p., 3 speeds,** brand new, with speedometer; £66.

**B.S.A., 1916, 4½ h.p., 3 speeds,** all chain drive; £58.

**B.S.A., 1916, 4½ h.p., 3 speeds,** combination; £65.

**B.S.A., 1915, 4½ h.p., 3 speeds,** all chain drive, combination; £58; exchanges and deferred payments.—Percy and Co., 337, Euston Rd., London. [7571]

**COLMORE Depots** 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798]

**4 h.p. B.S.A.,** kick start, clutch, chain drive; £32.—373, Katherine Rd., Forest Gate. [7448]

**B.S.A. New 1917 Model K's** in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888]

**B.S.A., 3½ h.p., 1912, free engine,** with T.T. handlebar, excellent order; £26.—Eagles and Co., High St., Acton, W.3. [X4842]

**B.S.A., 4½ h.p., late 1915,** complete with sidecar, lamps, horn, and tools; £55.—Batchelor, Clarence St., Kingston-on-Thames. [7533]

**1916 B.S.A., 4½ h.p., 3-speed,** chain drive, mileage under 1,000, condition as new; £57/10.—62, Osborne Rd., Southsea. [7373]

**B.S.A., 1914, 2-speed, 3½ h.p.,** in fine running order; £33/8; exchange or extended payments.—Service Co., 292, High Holborn, London. [X4814]

**B.S.A. 1916 Late Model H,** all chain, 4½ h.p., genuine B.S.A. No. 1 sidecar, every accessory, absolutely as new; £72/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7409]

**B.S.A. Motor Cycle, 1914-15,** in splendid condition, enamel and plating like new, brand new Palmer road tyres; £45; would consider Humberette or similar car.—B.S.A., 26, Stone St., Gravesend. [X4697]

**B.S.A. 1914 Combination, 4½ h.p., 3-speed** countershaft, complete with lamps, horn, and hood and very excellent condition; £47/10.—Longman Bros., King St., Acton. Phone: 1578 Chiswick. [7559]

**B.S.A., late 1916 model,** with coachbuilt sidecar, fitted with screen, complete with 3 lamps, horn, etc., only run few miles, absolutely indistinguishable from new; 70 gns.—Parker's, Bradshawgate, Bolton. [X4785]

**1917 B.S.A., chain-cum-belt,** very little used, 1,500 miles, Dunlop (unpunctured), Lucas lamp, horn, Bak easy starter, Grado vaporiser; cost £72 fitted, except £58; returning active service; seen any evening after 7.—Nelson, 15, Portland Crescent, Plymouth Grove, Manchester. [7511]

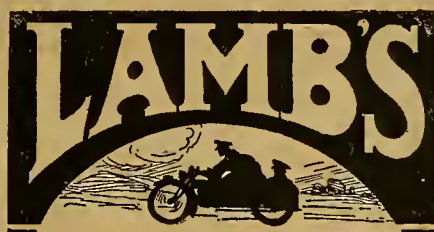
## Calcott.

**CALCOTT.** 1914, 2½ h.p., 3-speed; 19 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. [7441]

## Calthorpe.

**COLMORE Depots,** Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

**1916 2½ h.p. Calthorpe-Jap,** 2-speed Enfield gear, lamp, horn, etc., almost new; £30.—Simister, Jordanate, Macclesfield. [7402]



## WANTED AT ONCE—PRICE NO OBJECT.

**Harley-Davidsons, 5 h.p. Indians, 1914-15-16 B.S.A. Solo or Combinations, A.J.S., and a few 4-stroke Lightweights;** also Ford Van. Goods must be in top-hole condition. Proof of ownership essential. Call with machines where possible. Immediate settlement.

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**ENFIELD, 1917, 2½ h.p., 2-speed, 2-stroke** £44 2  
**ROVER, 1917, 3½ h.p., 3-speed, countershaft**  
 Combination with Sidecar ..... £39 4/6  
**JAMES, 1917, 3½ h.p., twin, 3-speed** ..... £69 10  
**JAMES, 1917, 4½ h.p., No. 6, 3-sp. Comb.** £87 2  
**ARIEL, 1917, 3½ h.p., 3-speed Combination** £93 10  
**LEVIS, 1917, 2½ h.p., 2-speed, Model E** ..... £47 10  
**LEVIS, Popular model** ..... £32 0  
**CALTHORPE-J.A.P., 1917, 2½ h.p., 2-speed,**  
 Enfield Sidecar ..... £39 16  
**CALTHORPE-J.A.P., 1917, 2½ h.p., 2-speed,**  
 with Sidecar ..... £50 0  
**ALLDAYS ALLON, all models from** ..... £37 10  
**ROYAL RUBYS, all models from** ..... £32 10  
**MATCHLESS, War Model, 7 h.p., 3-speed,**  
 spare wheel ..... £120 0

## SECOND-HANDS.

**B.S.A., late 1916, Model H, and genuine**  
 B.S.A. Sidecar, with accessories .... £72 10  
**HAZLEWOOD-J.A.P., twin, 5 h.p., 3-sp.,**  
 and coach Sidecar, all accessories .... £52 10  
**ENFIELD, 6 h.p., new January, 1917,**  
 beautifully fitted up ..... £94 10  
**LEVIS Popular, 1916, with speedometer**  
 and accessories ..... £27 10  
**NEW HUDSON Combination, 3½ h.p., 3-sp.** £35 0  
**2 HARLEY-DAVIDSON 1916 electric**  
 Combinations. Full particulars on application.  
**HARLEY-DAVIDSON, 1915, 3 lamps,**  
 Stewart Warner, and Imperial Sidecar  
 to match ..... £75 0  
**ENFIELD, very late 1916, 6 h.p. Comb.,**  
 dynamo lighting, condition very fine £110 0  
**ENFIELD, 1916, 6 h.p. Combination, lamps,**  
 hood, speedometer, screen ..... £84 0  
**ENFIELD, 1914, 6 h.p. Combination, 3**  
 lamps, horn, engine just been over-  
 hauled ..... £68 10  
**ENFIELD, 1916, 6 h.p., best Lucas acces-**  
 sories, speedometer, condition like 1917 £89 10  
**MATCHLESS, M.A.G. engine, 8B, 7 h.p.**  
 Combination, Lucas accessories .... £89 10  
**MATCHLESS, 1914, 8 h.p., J.A.P. Combination,**  
 speedometer, lamps, and horn .. —  
**INDIAN, 1915-16, 7-9 h.p., clutch model,**  
 T.T. bars, disc wheel, with lamps and  
 horn, ridden approximately 1,000 miles £55 0  
**TRIUMPH, 1913, 3½ h.p., 3-speed, semi-T.T.**  
 bars. A nice little solo mount ..... £35 0  
**TRIUMPH, 1914, 4 h.p., 3-sp., Sturmey-**  
 Archer gear, Millford Sidecar, speedo-  
 meter, lamps ..... £48 10  
**ALLON, 1916 model, 2½ h.p.** ..... £24 10  
**ALLON, 1917 model, 2½ h.p., 2-sp., hand**  
 clutch, full kit tools, and Stewart warn-  
 ing horn, ridden 200 miles only ..... £43 0  
**O.K. JUNIOR, 1914, 2-stroke** ..... £20 0  
**LEVIS, 1915, Popular Model** ..... £23 10  
**DOUGLAS, 1914, 2-sp., k-st. model, access.** —  
**HARLEY-DAVIDSON, 1915, electric model,**  
 and Phoenix Sidecar ..... —

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**SALESMAN and JUNIOR SALESMAN.**—Pro-  
 gressive position to right man. Easy berth  
 with plenty of scope. Wages immaterial.  
**FORD VAN.**—Not earlier than 1915.  
**QUICKLY.**—HARLEY-DAVIDSON Combination or  
 Solo, 1915-16, either model. Also B.S.A. Solo  
 or Combination.

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**WALTHAMSTOW,**  
**N.E.17.**  
 Also at 50, HIGH RD.,  
 WOOD GREEN, N.22  
 Only depot in this district.  
 Phone: Hornsey 1935.  
 Hours—9 to 6.  
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# MOTOR CYCLES FOR SALE.

## Calthorpe.

**RIDER TROWARD** and Co., 31 and 78, High St.,  
 Hampstead.—1915 Calthorpe-Jap, Enfield 2-speed  
 gear; 24 gns. (D). [7431]

**CALTHORPE-J.A.P., late 1915, 2½ h.p., Enfield 2-**  
 speed, perfect condition; £25, lowest.—Bolton,  
 Draper, Lichfield. [X4799]

**LATE 1915 Calthorpe, 2-stroke, 2-speed,** very good  
 condition throughout, lamp, etc.; £20.—A. M.  
 Mackintosh, Carr Bridge, Inverness-shire. [X4542]

**CALTHORPE, 1917 J.A.P., latest model, brand new,**  
 Enfield 2-speed, in stock; 59 gns.—Wilkins, Simp-  
 son, and Co., 11, Hammersmith Rd., London. [7312]

**CALTHORPE, 1917, 2-stroke, Enfield 2-speed, latest**  
 model; 34 gns.; brand new, in stock.—Wilkins,  
 Simpson, and Co., 11, Hammersmith Rd., London. [7320]

**CALTHORPE, 2-stroke, Enfield 2-speed, new, but**  
 slightly shop-soiled; special bargain, 30 gns.—Wil-  
 kins, Simpson, and Co., 11, Hammersmith Rd., London. [7321]

**CALTHORPE 1916 4 h.p. Twin Combination, Enfield**  
 2-speed gear, coach sidecar, handle starting, fine  
 order; 50 gns.—Batchelor, Clarence St., Kingston-on-  
 Thames. [7532]

**CALTHORPE, brand new 4½ h.p. twin J.A.P. com-**  
 bination, actually in stock; price £73/10 cash, or  
 plus 2½% extra for deferred payments.—Wm. White, J.  
 Ltd., Queen's Rd., W. [7395]

**CALTHORPE-J.A.P., 1915-6, 2-speed, and all acces-**  
 sories, condition equal to new, £28/10; also 3  
 new models in stock, 35 gns. each.—Lamb's, 151, High  
 St., Walthamstow, and 50, High Rd., Wood Green, N. [7414]

## Campion.

**1914 Campion, 2 h.p., 2-speed gear, 140 m.p.g., splen-**  
 did order and condition; £19/10 cash, bargain.  
 —Cook, 66, Richmond Rd., Lincoln. [7398]

**CAMPION, 1917, 8 h.p. J.A.P. engine, 4-speed Jardine**  
 gear box, coachbuilt sidecar, speedometer, indis-  
 tinguishable from new; £85.—Percy and Co., 337, Eus-  
 ton Rd., London. [7578]

**6 h.p. Campion-Jap, Gloria sidecar, 3-speed Sturmey-**  
 Archer hub gear, clutch, Bosch, Amac, tyres, tubes  
 new, lamps, horn, thorough good order; trial.—Jos.  
 Toynebe, North Kyme Fen, Lincoln. [7339]

## Chater-Jap.

**4 h.p. Jap-Chater, 2-speed, fast, powerful; £22.—53,**  
 Brownhill Rd., Catford. [7520]

## Chater-Lea.

**CHATER-LEA, No. 7, 8 h.p., 3-speed, chain drive,**  
 coachbuilt sidecar, hood, speedometer, watch, lamps,  
 overalls, etc., splendid condition; £56; seen by appoint-  
 ment.—L. G. Marlborough Mansions, Bromells Rd., Clap-  
 ham, S.W.4. [X4627]

## Clyno.

**CLYNO War Office Combinations** for immediate de-  
 livery from Colmore Depot, Birmingham and  
 Manchester; inclusive price with spare wheel, 100 gns.  
 [0884]

**CLYNO Combination, 1915, 6 h.p., screen, hood,**  
 fully equipped; great bargain, £50; seen any  
 time.—Sgt.-Major Soan, 30, Eltham Rd., Lee, S.E. [X4859]

**CLYNO, 1913-14, 5-6 h.p., 3-speed, and sidecar, P.**  
 and H. lamp set, Cowley 4 horn, sidecar com-  
 plete with spare wheel, £62; 1914-15, 3-speed, 5-6 h.p.,  
 and sidecar, £69; exchange or extended payments.—Ser-  
 vice Co., 292, High Holborn, London. [X4817]

## Connaught.

**CONNAUGHT, 2½ h.p., 1915, 2-stroke, T.T. handle-**  
 bar, variable ignition, all accessories; £20.—Eagles  
 and Co., High St., Acton, W.3. [X4839]

**CONNAUGHT Miniature, single speed, £33/17/6;**  
 ditto, 2-speed, £41/6/6; standard 2-speed, £44/9;  
 extended payments or exchange.—Service Co., 292, High  
 Holborn, London. [X4826]

## Coventry Eagle.

**COVENTRY Eagle, 2-speed, new; 42 gns.; extended**  
 payments or exchange.—Service Co., 292, High  
 Holborn, London. [X4832]

**COVENTRY Eagle (new), 2½ h.p. Villiers 2-stroke**  
 engine, 2-speed countershaft gear, Brampton  
 forks, Dunlop non-skid tyres; £42; extended pay-  
 ments arranged.—Harrods Motor Showrooms, 118,  
 Brompton Rd., London, S.W.1. [7474]

## Dot.

**DOT-J.A.P. 8 h.p. Combination, modern type; cost**  
 £120, take £65; consider exchange.—W. Lewis,  
 50, Athols Grove, Southampton. [X4525]

## Douglas.

**2½ h.p. Douglas, good condition; £22/10.—58, Lomoad**  
 Grove, Camberwell, S.E.5. [7365]

**DOUGLAS, 2½ h.p., equal new; £30.—Flying Officer,**  
 100, High Rd., New Southgate, N. [X4773]

**DOUGLAS, 1913, 2½ h.p., 2-speed, Bosch mag.; £30.**  
 —Leadley, 51, Carholme Rd., Lincoln. [X4793]

**DOUGLAS, 1913, unused 2 years, new appearance,**  
 all extras; £28.—Claydon, Eastry, Dover. [X4690]

**DOUGLAS.—Prompt delivery to those on work of**  
 national importance.—Gibb, Gloucester. [7479]



## MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS Motor Cycles, brand new, delivery from stock against priority permits.

DOUGLAS, 1916, 4h.p., 3 speeds, combination, as new; £75.

DOUGLAS, 1915, 4h.p., 3 speeds, combination; £70.

DOUGLAS, 1915, 2½h.p., 2 speeds, in good condition; £42.

DOUGLAS, 1914, 2½h.p., 2 speeds, in good condition; £38.

DOUGLAS, 1913, 2½h.p., 2 speeds, in good condition; £31.

DOUGLAS, 1911, in real good order; £17; exchanges and deferred payments.—Percy and Co., 337, Easton Rd., London. [7573]

1912 Douglas, perfect order and condition; £19 for quick sale.—251, Bentley Rd., Doncaster. [X4750]

DOUGLAS, 2½h.p. twin, good running order; bargain, £20/10.—King, 206, Fulham Rd., London. [7559]

1914 Douglas, 2½h.p., 2-speed, Philipson pulley; £45.—W. and H. Motor Co., Ltd., Deansgate, Manchester. [7188]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

LATE 1913 Douglas, 2-speed, splendid condition, lamp, horn, and many extras; £32, bargain.—Harper, Craven Arms, Salop. [X4624]

DOUGLAS, 1913, 2½h.p., 2 speeds, T.T. handle-bars, £51/10; 1912 2½h.p., 19 gns.—Motor Exchange, Horton St., Halifax. [7047]

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800]

1913 2½h.p. Douglas, 2 speeds, lamps, etc., just overhauled, guaranteed perfect; £30.—Simister, Jorngate, Macclesfield. [7404]

DOUGLAS, 1913, 2-speed, Bosch mag.; £35/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4824]

SPORTING Model Douglas, 2½h.p., T.T., late 1914, disc wheels, long exhaust, fully equipped; £44.—Albert, 1, Church St., Kingston, S.W. [7509]

DOUGLAS, 1914, 2½h.p., 2 speeds, lamps, footboards, nickel plated exhaust pipe; £36. Triumph wanted.—Palmer, 61, Commercial Rd., Lambeth. [7552]

4 h.p. Douglas, 1914-15, kick start, 2 speeds, Binks, Bosch, unused last 16 months, ideal sidecar or solo mount; £48.—28, Mitcham Rd., Tooting Broadway. [7503]

1915 2½h.p. Douglas, 2 speeds, electric lamps, speedometer, mechanical horn, very fast and reliable; £48.—Wellby Motor Garage, Woodford Rd., Forest Gate. [7342]

TWO T.T. Douglases, 1914 and 1913, for sale, or exchange for Harley-Davidson combination, T.T. bars preferred.—Advertiser, Bushey View, Hampton Wick. [7357]

1916 4h.p. Douglas Combination, 3 speeds, fully equipped, condition as new; £75.—Wellby Motor Garage, Woodford Rd., Forest Gate. Phone: 309 Stratford. [7341]

DOUGLAS, 1914, 2½h.p., T.T. bars, lamps, mechanical horn, mirror, speedometer, tools, spare belt and case; any trial; £38.—E.J., 201, Barton Rd., Stretford, Manchester. [X4625]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 T.T. Douglas, 2-speed, perfect, 35 gns.; 1915 4h.p. Douglas, 3-speed, coach sidecar, 55 gns. (D) [7433]

2½h.p. Douglas, 1913, 2-speed, sound and reliable, 24,600 miles, spares, and accessories, good tyres; £25.—Hayward, 7, Tennyson Mansions, Queen's Club Gardens, W.14. [X4626]

1914 Douglas, 2½h.p., 2-speed, Lucas best accessories, little used, absolutely new condition, perfect, fully equipped; £34/10.—Rose, 14, Cyprus St., Globe Rd., Old Ford Rd., N.E. [7490]

DOUGLAS, 1917, excellent condition, just overhauled, mileage 5,000, oversize Dunlops, 2 lamps, Klaxon, Stewart speedometer, T.T. bars, long exhaust; £35.—Holden, The Roekery, Downe, Kent. [7326]

DOUGLAS, 2½h.p., 2-speed W.D. all-black model, delivered new 1915, has not yet done 500 miles, tyres like new, mechanical horn, P. and H. head lamp and generator, tail lamp, 4 gallons petrol, tools, etc.; £45, or close offer.—Whale, 47, Alexandra Rd., N.W.8. [7579]

2½h.p. Douglas, absolutely new; immediate delivery of models U, V, W, clutch, kick start, against priority permits, for doctors, farmers, war and munition workers. How and where to apply.—For full particulars, write to the Douglas Specialists, Robinson's Garage, Green St., Cambridge. Tel.: 388. T.A.: Bicycles. [7466]

DOUGLAS Combination, 1914, 3½h.p., 2-speed, kick starter, clutch, laid up on outbreak of war until this summer, semi-sporting coachbuilt sidecar, 2 new tyres, Watford speedometer, new P. and H. head light, new Lucas generator and horn, 77 m.p.g. with passenger, in perfect condition; £55.—Percy Alfard, York Av., East Cotes. [X4744]

## MAUDES'



100, GREAT PORTLAND ST., LONDON, W.1.

Telegrams: "Abdicate, Wesdo, London."

Telephone: 552 Mayfair.

## SIDECAR COMBINATIONS.

DOUGLAS, 4 h.p., 1915, 3-speed Combination, 3 lamps, horn, speedometer ..... £66 0  
 INDIAN, 7-9 h.p., 1915, 3-speed, spring frame, Millford Sidecar to match, all accessories ..... £55 0  
 CLYNO, 6 h.p., 1914, khaki finish, detachable wheels, 3-speed ..... £65 0  
 SCOTT, 3½ h.p., 1914, 2-speed, kick-start, Myers Sidecar Chassis only ..... £50 0  
 EXCELSIOR, 8-10 h.p., 1915, 3-speed, coachbuilt Sidecar, electric lighting ..... £48 0

## LIGHT CARS, Etc.

SWIFT, 1915, 10 h.p., dynamo lighting, clock, and speedometer; just overhauled and repainted. As new ..... £225 0  
 MORGAN, 1916, 8 h.p., G.P. No. 1, J.A.P. engine, disc wheels, horn, lamps, speedometer, and clock. Finished red ..... £115 0  
 A.C., 1915, 10 h.p., de Luxe finish, dynamo lighting, 3-speed, clock, speedometer, 3 horns, absolutely like new ..... £220 0  
 MORRIS-OXFORD, 1914, 10 h.p., special sporting model, disc wheels, speedometer, revolution counter; very fast. A bargain ..... £200 0  
 BUCKINGHAM, 1914, 10 h.p., water-cooled, just overhauled ..... —  
 FORD, 20 h.p., flat van body, tyres almost new, magneto fitted, just overhauled ..... £65 0  
 NAPIER, 15 h.p. Landalette, Rudge wheels, all lamps, upholstered Bedford cord, and like new ..... £225 0

## SOLO MOTOR CYCLES.

SCOTT, 1914, 3½ h.p., 2-speed, and kick-start, just being overhauled ..... £28 0  
 RUDGE 3½ h.p. Multi, tyres like new, pedal-starting NEW IMPERIAL J.A.P., 1915-16, 2½ h.p., 2-speed, 2 lamps and horn. Had very little use ..... £28 0  
 ALLDAYS ALLON, 1917, 2-speed, and clutch; only ridden 25 miles, and as new ..... £40 0  
 LUGTON, 1915, 3½ h.p., good tyres, fine solo mount. Cheap ..... £24 0  
 REX 4 h.p. de Luxe, 2-speed, and handle-start, 2½m. tyres, spring forks ..... £22 0  
 RUDGE, 1912, 3½ h.p., fixed gear; very fast ..... £21 0  
 RUDGE 3½ h.p. clutch model, just overhauled, and new tyres fitted ..... £26 0  
 CALTHORPE, 1915, 2-speed, 2-stroke, adjusted to run on paraffin ..... £22 0  
 BAT-J.A.P., 5-6 h.p., special T.T. model, round tank. Very fast ..... £20 0  
 ARIEL, 2½ h.p., 3-speed, lightweight, magneto. Like new ..... £22 0  
 BRADBURY, 3½ h.p. horizontal twin, 3-speed, countershaft gear, kick-start, requires repairs ..... £32 0  
 ALLDAYS MATCHLESS, 2½ h.p., 2-speed, 2-stroke, requires assembling ..... £15 0  
 TRIUMPH, 1912, 3½ h.p., Bowden 2-speed, and kick-starter ..... £26 0

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MATCHLESS, 8 h.p., W.D. type, Sidecar, detachable wheels, and spare ..... £120 0  
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## MOTOR CYCLES FOR SALE.

Edmund.

EDMUNDS (new), 2½h.p. J.A.P., Royal Enfield 2-speed, spring frame, double tank, strongly-built machine; £54/12/6; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [7475]

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2½h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0638]

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801]

ENFIELD, 1917, 3h.p., perfect condition, Euk starter; £45.—Capt. Summelson, Musketry School, Hythe, Kent. [7476]

ENFIELD, 6h.p., 1916, fully equipped; any trial; £70, no offers.—Millard, 24, Sheridan Rd., Belvedere. [7515]

1915 6h.p. Royal Enfield and Sidecar, in first-class condition, not been used for 12 months; £68.—Box 1,195, c/o The Motor Cycle. [X4754]

1916 Enfield Combination, mileage 2,000, speedometer, Lucas lamp and horn, appearance new; £78.—37, Arlington Rd., Surbiton. [7518]

ENFIELD 1915 Combination, dynamo lighting, electric horn, speedometer, 3in. tyres, 2,500 miles; £80, no offers.—Priehard, Liuten Rd., Oxford. [7461]

ENFIELD Combination, 5h.p., 1916, petrol or paraffin, lamps, speedometer, spare parts, splendid condition; £45.—Morse, 69, Sotheby Rd., Highbury. [7318]

1916 Enfield Combination, 6h.p., Lucas dynamo lighting, hood, screen, in very good condition.—Eke and Co., 15-16, Bishopsgate Av., Cannonmole St., E.C.4. [0552]

ROYAL Enfield Combination, hood, screen, speedometer, lamps, Pillion, etc., equal new; £85; finest turnout in Shropshire; no offers.—Wilkes, Ellesmere. [X4768]

ENFIELD 3h.p. T.T. Model, 1917, run only 200 miles, and as new, fitted with lamps, horn, speedometer; £55.—Batchelor, Clarence St., Kingston-on-Thames. [7531]

ENFIELD Combination, 6h.p., late 1914, in perfect condition, lamps, horn, wind screen, tyres as new, spares; £49; seen by appointment.—73, Dalling Rd., Plumstead. [7359]

ENFIELD Combination, 1916 (late), 8h.p. picked engine, Lucas dynamo lighting set, spring handle-bars, hood and screen, small mileage, excellent condition; offers.—Below.

ENFIELD (May, 1916) 6h.p. Standard Combination, Bosch mag., Jones trip speedometer, Lucas lamp and horn, under 5,000, new condition; offers.—Celtic Works, East Hill, Wandsworth. [7384]

ENFIELD, 6h.p., late 1914, 2-speed, handle starter, good tyres, coachbuilt sidecar, head lamp, generator, rear lamp, fully equipped, and perfect throughout; bargain, £65. Below.

ENFIELD, 2½h.p., 1914, 2-speed, kick starter, all chain drive, Enfield grey, good tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout; bargain, £34.—Mebes and Mebes, 156, Gt. Portland St., W.1. [7261]

ENFIELD Latest 1917 Combination, run few miles, indistinguishable from new, fitted complete with lamps, mechanical horn, etc.; £100, lowest.—Parker's, Bardslawgate, Bolton. [X4784]

ENFIELD Late 1914 6h.p. Coachbuilt Combination, engine perfect, tyres (650x65) as new, lamps, horn, speedometer, 70 m.p.g.; £55, or best offer.—Fox, 27, Allan St., Rotherham. [7382]

1916 6h.p. Enfield Combination, dynamo lighting, speedometer, and Pillion seat, as good as new; 95 gns.—Wellby Motor Garage, Woodford Rd., Forest Gate. Phone: 309 Stratford. [7343]

2-SPEED 3h.p. Twin Enfield, Jones speedometer, lamp, tools, kick start, fitted vaporiser for paraffin, excellent condition; £30; seen appointment.—Hiscock, 62, Hawstead Rd., Catford. [7336]

ENFIELD 6h.p. Combination, late 1916, lamps, tools, speedometer, mechanical horn, new extra heavy Dunlop back, excellent order and condition, insurance policy, petrol; £82, or nearest.—Russell, 85, Bernadsey St., S.E. [7298]

ENFIELD 1916 Combination, 6h.p., 2-speed, combined clutch, Amac carburettor, Bosch mag., fitted with mechanical horn and speedometer, only done 2,000 miles, £90; 1915 combination, 6h.p., 2-speed, clutch, Thompson-Bennett mag., Amac carburettor, fitted with lamps, Stewart speedometer, and horn, £87/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [X4636]

ENFIELD 1916 Dynamo 6h.p. Combination, hood, screen, speedometer, £110; Enfield 1916 standard 6h.p. combination, 3 lamps, hood, screen, speedometer, £84; Enfield 1914 standard 6h.p. combination, 2 lamps, £68/10; Enfield 1916 standard 6h.p. combination, 3 Lucas lamps, Cowey, horn, £89/10; Enfield 1917 standard 6h.p. combination, new in January, 6 gns. speedometer, horn, £94/10; also brand new 1917 2½h.p., 2-stroke, 2-speed, £44/2.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Weed Green, N. [7406]



## MOTOR CYCLES FOR SALE.

### Enfield.

**ENFIELD** 1916 6h.p. Combination, condition perfect as new, Otto wind screen, speedometer, Lucas lamps and horn, Low generator, mirror, Pillion seat and back rest, watch, Stewart horn, luggage grid, with petrol carrier, 2 tyres, chain, and other spares; £95, lowest, complete; 285 without extras.—Saxmington, Picture Framers, 24, Battersea Rise, Clapham Common, London. [7313]

### Excelsior.

**AMERICAN** Excelsior and Sidecar, 4½h.p.; price £25.—A. Bryant, 7, Havelock St., York Rd., Islington, N. [7355]

**EXCELSIOR**, 1916, 2½h.p., 2-stroke, 2-speed, clutch, lamps, Stewart horn; must sell, money wanted; £30.—Box L4,451, c/o The Motor Cycle. [7406]

**EXCELSIORS**—All models in stock; magneto model £75, electric lighting model £85; got a big X. You'll be satisfied.—Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester. [X1462]

### F.N.

**1914** 5-6h.p. 4-cyl. F.N. fixed engine, new Amac, new back tyre, fast, good condition; £28.—59, Howard Rd., Upminster. [7297]

**F.N.**, 4-cyl., clutch, Bosch waterproof, good order; £18.—1, Criterion Buildings, Windows Bridge, Thames Ditton. [7485]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—7-9h.p. F.N., 4-cyl., coachbuilt combination, 3-speed, clutch, kick start; 72 gns. (D) [7434]

**F.N.**, 2½h.p., mag., footboards, nice, comfortable machine, acetylene lamps back and front, everything in good condition; must sell: £10; trial; take lady's and gear's cycles in exchange.—Cole, 94, Priory Park Rd., Kilburn. [7295]

### Green.

**GREEN-PRECISION**, water-cooled, 4½h.p., 1914 model, with cone sidecar, all chain drive, 2-speed countershaft gear, handle starter and clutch, good tyres, repainted, unused since; any trial or examination; £44.—G. Holland, Mayland, Wilmington, Kent. [7361]

### Harley-Davidson.

**HARLEY** 1915½ Combination, mileage 1,650, as new; £70.—51, Maplethorpe Rd., Thornton Heath, S.E. [7477]

**HARLEY-DAVIDSON**, 1915, 7-9h.p., brand new, electric, 3-speed; offers wanted.—R. Wootton, Longford, Coventry. [X4700]

**1916** Harley-Davidson and Montgomery sidecar, lamps, horn; £87.—Elice and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0492]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Harley-Davidson, 1915, T.T., 7-9h.p., 3-speed; 52 gns. (D) [7455]

**COLMORE** Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802]

**1915** 7-9h.p. Harley Combination, dynamo electric lighting, magnificent turnout, not done 1,500 miles; sacrifice £72.—Elice, Dinaple, Matlock. [X4760]

**HARLEY-DAVIDSON**, 7-9h.p., 3 speeds, combination, electric equipment, in nice condition throughout; £70.—Percy and Co., 337, Euston Rd., London. [7576]

**HARLEY-DAVIDSON**, 1917 Model, 7-9h.p., Bosch mag., Millford sidecar, guaranteed in perfectly new condition, and not ridden 100 miles; lowest price £110, 20 offers.—Address, C. Brusty House, Burton Joyce, Nottingham. [7316]

**HARLEY-DAVIDSON**, electric model; this machine was only used for 3 months, and has since been stored away for my going on active service; as good as new; price £60, no lower offer.—Major Baldwin, 8th Corps Cyclist Battalion, B.E.F., France. [7555]

**HARLEY-DAVIDSON**, 1915, plain model, with nice coach sidecar, all accessories, perfect condition. £75; also two 1916 electric combinations, prices and fuller particulars on application.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7412]

**HARLEY**, 1916 racing model, 7-9h.p., single-speed, clutch, racing exhaust pipes, rubber covered footboards, T.T. handle-bars, Goodyear tyres, finished in Harley grey; this machine is an ideal sporting mount, and has had very little use; £63/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4819]

### Harris.

**HARRIS-PEUGEOT**, 3½h.p., 1913, clutch, single, Bosch, B. and B. good appearance and condition; £18.—Box 1,190, c/o The Motor Cycle. [X4772]

### Hazlewood.


**1915** 5-6h.p. Twin Hazlewood Combination, 3 speeds, combined belt and chain, kick start; £58/10.—Motor Exchange, Horton St., Halifax. [7048]

**1915** Hazlewood 5-6h.p. Twin Combination, Swan sidecar, 3-speed gear box, kick starter, Binks carburettor, lamps; £50.—A. Conyers, West St., Blandford, Dorset. [7306]

**HAZLEWOOD-J.A.P.**, 2½h.p., single speed, Bosch, Druid forks, heavy Dunlops, footboards, 2 brakes, horn, pump, toolbag, etc., splendid condition; must sell, or first £15 secure, bargain.—Cook, 40, Upper Orwell St., Ipswich. [7300]

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## MOTOR CYCLES FOR SALE.

### Hazlewood.

**HAZLEWOOD-J.A.P.**, 5h.p. twin, 3-speed combination, kick starter, nicely fitted up; £52/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7411]

**HAZLEWOOD** 1915 Combination, 5-6h.p. J.A.P. engine, 3-speed clutch, and kick starter, Lucas lamps, speedometer, special sidecar; £72/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4827]

### Hobart.

**HOBART**, 2-stroke, 2-speed, brand new, only done 200 miles; owner called up; a bargain, 50 gns.; seen any time.—41, Brighton Rd., Croydon. [7370]

### Humber.

**HUMBER** Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

**1913** 3-speed Humber and Millford coachbuilt sidecar; any trial; offers.—Rose, 38, Dane Rd., Linton. [X4527]

**1914** 3½h.p. 3-speed Humber, lamp, etc.; £35, cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863]

**HUMBER**, 1912, 3½h.p., 2 speeds, spring forks, in good condition; £24.—Motor Exchange, Horton St., Halifax. [7049]

**FOR** Sale, 3½h.p. Humber, 1913, 2-speed, handle start, speedometer, lamps, in good order; £25.—Meeks, 55, Dalling Rd., Hammersmith. [7310]

**1914** Humber, 3½h.p., 2-speed, free, clutch, etc., in fine condition, very little used, will run on paraffin; bargain, £33.—Box 1,198, c/o The Motor Cycle. [X4860]

### Indian.

**1912** 4h.p. Blue Indian, 2 speeds, free engine; £22/10.—Motor Exchange, Horton St., Halifax. [7050]

**INDIAN**, 5h.p., going order; seen any day 10 to 12, 1 to 7.30.—Coleman, St. John's Rd., Hopton. £18. [X4783]

**1915** Indian Model C, sporting sidecar; £60; overhauled.—Edwards, 103, Killern Rd., Catford. [7453]

**INDIAN**, 1916, 5h.p., 3-speed, little used, excellent condition; owner joined Forces; £52/10.—Horsfall, Kingston Dene, Halifax. [X4708]

**1912** Indian, 7-9h.p., view London; good condition; owner at Front; £30, offers.—Portridge, 55, Kenilworth Rd., Leamington Spa. [X4657]

**7-9h.p.** Indian Combination, 1914, very fast, not done 8,000 miles; any trial; £57/10.—The Purley Motor Garage, Ltd., Purley. Tel.: Purley 103. [7333]

**INDIAN** 1915 5-6h.p. Combination, 3 speeds, speedometer, in real nice condition throughout; £60.—Percy and Co., 337, Euston Rd., London. [7575]

**1916** 5h.p. Twin Indian and sidecar to match, lamps, horn, speedometer, perfect order; £60, or offers.—Scott, Ladywells, Ecclefechan, Dumfriesshire. [7525]

**1914** Indian Combination, 7-9h.p., electrically equipped, first-class order, go anywhere, climb anything; £45, or near offer.—251, Bentley Rd., Doncaster. [X4748]

**1916** Powerplus Indian Combination, spring frame, Lucas lamps, speedometer, mileage about 2,000, tyres in good order; £80, or nearest offer.—Beaunet, 19, Monument Rd., Wigan. [X4786]

**INDIAN**, 7-9h.p., clutch model, Dunlops, Lucas, T.T. horns, splendid running order; £27/10; ride 20 miles; exchange, with cash either way.—A. Goddard, Norwood Court, Southall. [7377]

**INDIAN**, 1916, 5h.p., and Millford sidecar, mileage run small, expert owner, numerous extras, everything of the best, and in perfect order; 85 gns.—Box 1,175, c/o The Motor Cycle. [X4526]

**INDIAN**, 1916 7-9h.p., Powerplus Model, with sporting Canoelet sidecar, Lucas lamps, etc.; price £90 cash, or plus 2½% extra for deferred payments.—Wm. Whiteley, Ltd., Queen's Rd., W. [7394]

**INDIAN** Late 1914 7-9h.p. Combination, 2 speeds, 20 gn. Swan sidecar, wind screen, lamps, speedometer, mechanical horn, etc., sporty lot, splendid condition; £48, bargain.—436, Whitehorse Rd., Thornton Heath. [7486]

**INDIAN**, 7-9h.p., 1915-16, clutch model, 2 lamps, speedometer, horn, exquisite condition; £55; wanted, 5h.p. model of combination, at once.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7413]

**1914½** 7-9h.p. Indian Combination, spring frame, 2-speed, electrically equipped, lamps, horn, speedometer, absolutely perfect throughout, fitted for substitute if necessary, beautiful turnout; £65.—Welsh, Belmont, Surrey. [7304]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1916 2-stroke Indian, 3-speed, clutch, kick start, 37 gns. 1916 Powerplus Indian coach combination, T.T. bars, 78 gns.; 1915 T.T. 7-9h.p. Indian, clutch, 39 gns.; 1914 7-9h.p. Indian, spring frame, 2-speed, clutch, kick start, 35 gns. (D) [7426]

**IVY**, 2½h.p., 1914-15, guaranteed as new, new Dunlop; £16.—Curte, 82, Leghorn Rd., Harlesden, N.W.10. [7378]



## MOTOR CYCLES FOR SALE.

## Ivy.

**IVY**, 2-stroke, 2½ h.p., 1915, good tyres, fully equipped, as new throughout; £225.—Advertiser, 156, Gt. Portland St., W.1. [3924]

**IVY**, 2½ h.p., 2-stroke, single speed, excellent condition throughout; £25/5; exchange or extended payments.—Service Co., 292, High Holborn, London. [X4818]

## Ixion.

**1915 Ixion**, 2½ h.p., 2-stroke, tip-top order, unriden for 18 months, condition like new, new tyres, tubes, and belt, complete with lamps, etc.; bargain, £23.—Cook, 66, Richmond Rd., Lincoln. [7387]

## James.

**COLMORE** Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803]

**1917 James**, 2-stroke, absolutely as new, and complete for the road; £37.—Cross, Agent, Rotherham. [X4787]

**JAMES**, 4½ h.p., 1913 model, with 3-speed gear, foot clutch, good condition; £26.—Eagles and Co., High St., Acton, W.3. [X4838]

**JAMES** 1913 Big Single Combination, 4½ h.p., chain drive, 3-speed, clutch, and kick starter; £30.—11, Gordon Rd., Church End, Finchley, N.3. [7371]

**1913 James** Combination, waterproof Bosch, chain drive, countershaft 2-speed gear, coach-built body; £36.10.—Motor Exchange, Horton St., Halifax. [7051]

**JAMES**, 1913, 3½ h.p., single, clutch model, Bosch, new tyres, splendid condition; £21.—appointment.—Phelps, 68, Morton Rd., Islington, London, W. [X4777]

**JAMES** 1917 Model 4½ h.p. Combination, under 800 miles, tyres Dunlop, unpunctured, steel studded back, Lucas King Dick lighting set and horn, saddle, Brooks B170, everything as perfect as left makers; any trial or mechanical inspection; £75.—33, Jubilee Rd., Dorchester. [7325]

## J.A.P.

**4 h.p.**, 1916 J.A.P., 2-speed, kick starter, all chain, sidecar; £45.—Digby, Mersea, Essex. [7109]

**6 h.p.** J.A.P. Combination, Bosch, B. and B., Druid, lamps, horn, low, run paraffin; £26, near offer.—152, Camberwell Grove, Camberwell. [7368]

**J.A.P.**, 1915, 8 h.p., 3-speed countershaft, coach sidecar, cost £100, all as new; 59 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [7442]

## J.E.S.

**J.E.S.**, beautiful little machine, 200 m.p.g. specially fitted, B. and B. Dixie, motor cycle handlebars, Brooks saddle, equal any 2 h.p.; £15, or close.—Bord, 37, Ashdale Rd., Teignmouth, Dublin. [X4632]

## J.H.

**J.H.**, 2-speed, new; £35/14; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4833]

**J.H.**, 1917, new, 2½ h.p., 2-speed, 2-stroke; 42 gns.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7192]

## Kerry.

**KERRY-ABINGDON**, King Dick, 2-speed, clutch, handle starter, good condition and clumber; cheap to clear.—Champion, Buckland, Betchworth, Surrey. [7374]

## Kynoch.

**KYNOCH-J.A.P.**, 4 h.p., 3-speed, clutch, Bosch, in good running order, also sidecar; £28.—Morris, Coventry House, Linsfield. [X4683]

## Levis.

**LEVIS**, 2½ h.p., 1915, splendid condition, runs 90 miles gallon; £22.—92, Sydenham Rd., Croydon. [7512]

**COLMORE** Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804]

**1915 Levis**, excellent condition; accept £17, immediate sale.—Thorpe, Whitehorse Rd., Thornton Heath. [7487]

**LEVIS** 1917 2½ h.p. Popular, hardly used, fine machine, lamps, horn, all accessories; £27.—Cummings, 2, Crescent, Dursley, Glos. [X4752]

**LEVIS** Popular, 1916, new condition, lamps, horn, spares, new belt and tyres; £26.—Kearley, 64, Abbeyfield Rd., Rotherhithe, S.E. [7444]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1916 Levis Popular, 22 gns.; 1915 2½ h.p. Levis, 2-speed, 26 gns.—(D) [7432]

**LEVIS** 1915 Popular Model, 2 lamps, generator, horn, tyres in excellent condition; £19.—Write, Rex Mundy, 32, Knoll Rd., Wandsworth. [7550]

**LEVIS**, 2½ h.p., 1915, 2-stroke, head lamp, generator, rear lamp, good tyres, fully equipped; bargain, £24.—Advertiser, 156, Gt. Portland St., W. [6609]

**LEVIS**, 2½ h.p., 1917, latest model E, Enfield 2-speed, chain drive, brand new, in stock; £27/10.—Wyllins, Simpson, and Co., 11, Hammersmith Rd., London. [7322]

**LEVIS**, 2½ h.p., No. 1 Model, 2-speed, chain-cum-belt drive, rubber studded tyres, brand new, in stock for immediate delivery; reduced price £44.—Mehees and Mehees, 156, Gt. Portland St., W.1. [7564]

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1915	INDIAN, 3½ h.p., T.T. bars, lamps, horn, good order	£40 0
1915	INDIAN, 5 h.p., 3-speed, lamps, horn	£45 0
1916	Lady's NEW IMPERIAL - J.A.P., soiled only	£46 10
1917	NEW IMPERIAL-J.A.P., shop-soiled	£38 0
1916	NEW IMPERIAL-J.A.P., T.T. bars, as new	£35 0
1914	TRIUMPH, 4 h.p., 3-speed, lamps, horn	£37 10
1914	HUMBER, water-cooled, 3½ h.p., 3-speed, clutch	£30 0
1915	ENFIELD, 3 h.p., lamps, horn, speedometer	£38 0
1916	B.S.A., 4½ h.p., 3-speed, all-chain drive	£48 0
1916	ALLDAYS ALLOAN, 2½ h.p.	£22 0

## COMBINATIONS.

1916	SUNBEAM Combination, 8 h.p., M.A.G. lamps, horn, windscreen	—
1916	ENFIELD Combination, 6 h.p., Lucas dynamo, hood, screen	—
1916	HARLEY-DAVIDSON and Montgomery Sidecar, fully equipped	£89 0
1917	ROVER Combination, 3½ h.p., lamps, horn, as new	£90 0

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CAMOMILE STREET, LONDON, E.C.3.

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## MOTOR CYCLES FOR SALE.

## Levis.

**LEVIS** E 47/10, and Popular £32, in stock; also 1916 Popular Levis, with speedometer, lamps and horn, £27/10; also Baby 2½ h.p. Levis, £23/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7410]

## Lincoln-Elk.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Lincoln-Elk, 1913, 3½ h.p., variable gear, good order; 19 gns. (D) [7436]

## Matchless.

**MATCHLESS**, 8 h.p. twin J.A.P., overhead, in real good order and condition; £30.

**MATCHLESS**, 5-h.p. twin J.A.P., free engine; £26.—Percy and Co., 337, Enston Rd., London. [7577]

**MATCHLESS** Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881]

**MATCHLESS**, 1917, 8 h.p., war model combination, spare wheel.—A. H. Price, Mount Pleasant, Bradford-on-Avon. [7178]

**MATCHLESS**, 440, 1913, 8 h.p., Gloria sidecar, 3 Lucas lamps and horn, Covey speedometer; keen appointment only.—Gleustier, 40, Lavender Sweep, S.W.11. [7392]

**MATCHLESS**, late 1915, 7 h.p. M.A.G., coachbuilt sidecar, just repainted black, and gold line, as per Sunbeam, all accessories; £85.—Cass's Motor Mart, 5, Warren St., Euston Rd., W.1. Museum 623. [6821]

**MATCHLESS** 1917 Combination, 8 h.p., 3-speed, clutch, and kick starter, detachable wheels, including spare wheel, new; £120; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4635]

**MATCHLESS**, Model 8B, M.A.G. engine, late 1914, 2-seater coachbuilt sidecar, speedometer, lamps, horn, new Palmer cord tyres, foot warmer, splendid condition and order; £80, outfit cost over £120.—Cox, Halls Rd., Kingswood, Bristol. [7566]

**MATCHLESS** 8B 7 h.p. Combination, speedometer, 3 lamps, coach Pillion seat, luggage and petrol grid, condition as 1917 model, £89.10; also 1914 8 h.p. J.A.P. model, with sidecar, very decent order, what offers? new war combination, delivered from stock, with spare wheel, £120.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7415]

## Minerva.

**3½ h.p.** Minerva, in good running condition; £12.—A.B., 167, Cator St., Peckham. [7362]

**3½ h.p.** Minerva, B. and B., new tyres, Lycetts belt, fast, perfect, £10; wanted 4-cyl. F.N.—Nelson, 470, Wandsworth Rd., London, S.W. [7443]

## Motosacoché.

**MOTOSACOCHE**, 1914, M.A.G. engine, 3½ h.p. twin, Enfield 2-speed gear, handle starting, very small mileage, fast machine, will run on paraffin, in fine condition throughout; bargain, £28/10.—Box 1187, c/o The Motor Cycle. [X4696]

## New Hudson.

**NEW HUDSON** T.T. 2-stroke, done 1,500 miles; bargain, £21.—35, Franconia Rd., Clapham Park. [7302]

**1914 New Hudson** 6 h.p. Twin Combination, 3-speed, perfect; £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7190]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—New Hudson, 1914, 3-speed, clutch, kick starter; 25 gns. (D) [7437]

**1915 2½ h.p.** 2-stroke New Hudson, good condition; £20, or near offer; owner going away.—E. Hambrook, Swigsfield, Dover. [X4691]

**1915 New Hudson** 2-stroke, Lucas accessories, new tyre and belt; £18, offers.—Childow, Holmwood, Bromsgrove Rd., Redditch. [X4701]

**NEW HUDSON** Lightweight, Sturmer 3-speed, clutch model, in new condition, all on; £28.—Singleton, Brook Lane, Sarisbury Green, Hants. [X4667]

**1915 New Hudson**, 2-stroke, 2 speeds, free engine, complete with lamps, horn, etc.; £22.—Wellby Motor Garage, Woodford Rd., Forest Gate. [7344]

**NEW HUDSON**, 1913, 3½ h.p., 3-speed, clutch, in good running order; £34/15; exchange or extended payments.—Service Co., 292, High Holborn, London. [X4616]

**NEW HUDSON** 6 h.p. Twin Combination, late 1914, 3-speed, P. and H. lamp, horn, Jones speedometer, spares, tyres 650x65, Dunlop and Kempshall, good as new, Dunlop belt, engine overhauled this month by New Hudson, Ltd., splendid outfit; trial, appointment; £45 lowest.—A. C. Bygraves, Manor House, Langford, Bedfordshire. [7516]

## New Imperial.

**NEW IMPERIAL**, 1917, 2½ h.p., 3½ h.p., 6 h.p. models, in stock.—Crow Bros., Guildford. [2563]

**COLMORE** Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0806]

**1917 New Imperial-Jap**, as new, 500 miles only; owner D.R.; lamps, horn, accessories; £38.—Polden, Draper, Hitchin. [X4805]

**1916 New Imperial-Jap**, 2½ h.p., 2-speed, bought new in June, 1917; first cheque for £35 secures it.—Longhurst, Sunnyside, Ewell. [7526]



## MOTOR CYCLES FOR SALE.

## New Imperial.

**NEW Imperial-Jap**; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter and Tavistock Rd., Plymouth. [0839]

**NEW Imperial-Jap**, 1915, 2½ h.p., 2-speed, just re-enamelled, tyres and belt almost new; very great bargain, £22/10.—Gott, Cowling, Keighley. [X4802]

**NEW Imperials**, 1917 models, for immediate delivery, No. 1 39 gns., No. 2 46 gns.; two new 1916 models No. 1 at £38.—Colmore Depots, 211, Deansgate, and 31, Reenshaw St., Liverpool. [0836]

**NEW Imperial (new)**, 2½ h.p., 2-speed; £40/19; actually in stock for immediate delivery; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [7470]

## Norton.

**NORTON**, 1917, as new, fully equipped; £75.—Colmore Depot, 31, Colmore Row, Birmingham. [X4649]

**RIDER TROWARD and Co.**, 31 and 78, High St., Hampstead.—Norton, 1915, T.T., Philipson; 32 gns. [7438]

**NORTON 4 h.p.** 1916, T.T., sporting com., lamps, etc., in perfect condition; £75, or exchange.—T., 85, Revelstoke Rd., Wimbledon Park, S.W. [7568]

**1914 (December) 4 h.p.** 3-speed Norton, Gloria sidecar, lamps, speedometer, horn, tools, etc.; cost £95, £55.—Simister, Jordangate, Macclesfield. [7403]

**1917 3½ h.p.** Norton T.T. Roadster, Philipson pulley, delivered April, very fast, splendid condition; £56.—Lees, Fife House, Enford, Pewsey, Wilts. [7315]

## N.S.U.

**HAVING** Acquired the entire Stock in Trade of the N.S.U. Motor Co., Ltd., we can now supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Eagles and Co., Acton Hill Works, Acton, W.3. [X4840]

## O.K.

**O.K. Juniors**—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn. [0910]

**O.K. Junior**, Mark IV., standard, new; 38 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4831]

## P. and M.

**1915 P. and M.**, complete with sidecar, hood, screen, and all fittings, splendid condition; £75.—Turpin, 29, Preston Rd., Brighton. [5500]

**P. and M. Combination**, coachbuilt, 3½ h.p., 1912, 2-speed, in splendid condition, well equipped, lamps, generators, Stewarts signal, good tyres, etc.; £35; also two good wicker bodies, 10/- each.—R. J. Murrord, 120, High St., Wendstone, Harrow. [7451]

## Peco.

**PECO (Regal-Peco)**, 1915, 2½ h.p., 349 c.c., the reliable 2-stroke, in excellent order, Senspray, Bst and Lloyd drip feed, long extension pipe, low saddle position, 2½ Hutchinson tyres, petrol; £22.—Letters only, Barton, 78, Gt. Western Rd., W.11. [X4856]

## Precision.

**2 h.p.** Torpedo Precision, 1914, perfect order; £16.—B., 472, Archway Rd., Highgate, N. [7301]

**4 h.p.** 1914 Precision, chain drive, clutch, 2-speed, family sidecar, all accessories; £43.—193, Belgrave Gate, Leicester. [X4756]

## Premier.

**PREMIER**, 3½ h.p., late 1916, 3-speed countershaft gear, kick starter, all on, sidecar, bike unscratched; £56.—E. Howells, Garn Rd., Blenauvon. [7360]

**1914 2½ h.p.** Premier, single gear, enamel and plating excellent condition, engine as new, original bearings; £17.—34, Highdown Rd., Hove, Sussex. [7296]

**PREMIER**, 3½ h.p., 3-speed, free engine, Mills-Fulford sidecar, £30 for quick sale; exchange 2½ h.p. Douglas, cash either way; trial by appointment.—Sutton, Rowsley. [X4791]

**PREMIER Spare Parts**; motor cycle riders, also agents.—We have large stock of new cylinders, pistons, valves, piston rings, bushes, gear parts, driving chains; almost everything you require.—Sattley Trading Co., 11, Alum Rock Rd., Salford, Birmingham. [X4523]

**PREMIER**, 1915½, 3½ h.p., 3-speed countershaft, kick start, speedometer, large Miller lamps, also electric lighting, new Wood-Milne back, new Pedley front, £25 Watsonian cabriolet coachbuilt sidecar, all in perfect condition; any trial; £54.—1, Ravenstone St., Bham, S.W.12. [X4672]

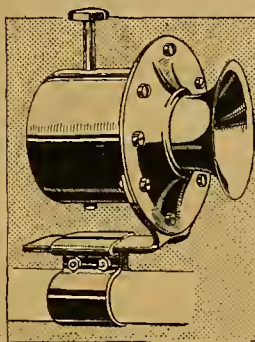
**PREMIER** Combination, 1915, 3½ h.p., 3-speed countershaft, kick starter, new tyres and belt, beautiful Canoelet sidecar, with hood and screen, large P. and H. head lamp and sidecar lamp, Lucas horn and rear lamp, tools, and pump, been well kept, and all as new; bargain, £50.—Seen and tried at Butterworth's Garage, 64, Mill Lane, Brixton Hill. [X4688]

## Quadrant.

**QUADRANT**, 4 h.p., 1916, 3-speed, all chain, kick start; £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7191]

**3 h.p.** Quadrant, Bosch mag., Senspray carburettor, good tyres, excellent condition; £14.—Mather, Market Place, Earlsdon, Berwickshire. [7314]

## British Horn



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## MOTOR CYCLES FOR SALE.

## Regal.

**4½ h.p.** Twin Regal-Precision, 1915, Jardine 2-speed 42 gear, clutch, and starter, countershaft, complete with sporting sidecar, in excellent condition; 45 gns.; exchanges considered.—Write, 22, Blythwood Rd., N.4. [7523]

## Rex.

**3½ h.p.** Rex, rebushed, Ruthardt mag.; £8.—11, Bollo Lane, Acton Green, W. [X4375]

**1911 6 h.p.** Rex, 2-speed, b.s.; bargain, £14.—53, Brownhill Rd., Catford. [7519]

**REX**, 1912, 6 h.p., 2-speed, F.E., sidecar; a war bargain, 16 gns.—Barker, 26, Rochford Ar., Westcliff-on-Sea. [X4778]

**REX** 1913 6 h.p. Combination, 2-speed, kick start, Whittle belt, in good condition; £36.—55, King Edward's Rd., Ware. [X4311]

**2 h.p.** Rex, 3 speeds and free engine, Bosch mag., £24/10; 3½ h.p., 2-speed model, £23/10.—Motor Exchange, Horton St., Halifax. [7054]

**3 h.p.** Rex, Bosch, h.b.c., tyres and condition good, running order; £12/12.—4, Gloucester Villas, Church Rd., Addlestone, Surrey. [7593]

**REX**, 5-6 h.p., Roc 2-speed, free, handle start, coach combination, good order; £20 only.—Hubbard, 60, Chalk Farm Rd., London, N.W. [X4697]

**REX**, 4 h.p., T.T., Bosch, B. and B., good tyres, very low, fast, runs on paraffin; £16.—S. Cuckson, Black Lion, Firbeck, near Rotherham. [X4781]

**REX** Motor Cycle and Sidecar, 1913, 5-6 h.p., 2 speeds, free engine; £38; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4821]

**REX** 6 h.p. 1913 Combination, 2-speed, handle start, engine rebushed, gears overhauled last May; trial; £26.—Dennison, Lea View, Town St., Horsforth, near Leeds. [X4804]

**REX**, 1912, 4 h.p., free engine, handle start, Bosch, B. and B., nearly new non-skid tyres, new belt, lamps, and horn, in good condition; £22/10.—J. W. Birtwistle, Hartford, Cheshire. [X4670]

**6 h.p.** Rex, 1914, newly enamelled and plated, tyres as new, Bosch, all lamps, speedometer, and Klaxon, T.T. Model, 65 m.p.h.; £30, or near offer; exchanges.—M., 22, Blythwood Rd., N.4. [7522]

## Rex-Jap.

**1913 Rex-Jap**, 6 h.p., 2 speeds, coachbuilt sidecar, speedometer, spring seat; £38, or exchange Douglas.—3, Oxford St., Bognor. [7369]

## Roach.

**1912 3½ h.p.** Silent Roach, Abingdon gear, 2-speed, belt and chain; £24/10.—Motor Exchange, Horton St., Halifax. [7052]

## Rover.

**COLMORE** Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [0883]

**ROVER**, 3½ h.p., Bosch, accessories, lamp; overalls; £25; appointment.—19, King's Rd., Teddington. [7358]

**ROVER** Motor Cycles, 1917 models from stock; £74/10; two only; first cheque secures.—Colmore Depot, 211, Deansgate, Manchester. [0887]

**1917 Rover** Combination, 3½ h.p., only a few weeks old, fully equipped, and guaranteed as new; £90.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491]

**ROVER**, 3½ h.p., late 1916, 3-speed countershaft, kick starter, head lamp, generator, rear lamp, very nice mount, perfect throughout; £60.—Mebs, and Mebs, Original Light Car Specialists, 164-6, Gt. Portland St., W.1. [7563]

## Royal Ruby.

**ROYAL Ruby**, 2½ h.p., 1916, 2-stroke, excellent condition; £23.—Box L4,408, c/o The Motor Cycle. [7312]

**ROYAL Ruby**, 2-stroke, single speed, new; £29/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4830]

**ROYAL Ruby**, 2½ h.p., 2-stroke, 1915 model, in splendid condition, new tyres and belt, 2 lamps, horn, etc.; any trial; bargain, £22.—G. Holland, Mayland, Wilmington, Kent. [7380]

**ROYAL Ruby**, 2½ h.p., 4-stroke, practically new, run less than 1,000 miles; cost £51, with lamps, horn, etc.; owner joined up; price £43.—Waters, 12, Shrewsbury Rd., Redhill, Surrey. Tel.: 73. [7328]

## Rudge.

**RUDGE**, I.O.M. special, fast machine, almost new; £50.

**RUDGE**, N.S.U. 2 speeds, in nice condition; £23.—Percy and Co., 337, Euston Rd., London. [7574]

**RUDGE**, 3½ h.p., 1913, in first-class order, fully equipped; £27.—B. Mitchell, Beechwood, Dalkeith. [X4761]

**1913 Rudge** Multi 3½ h.p., clutch, speedometer, horn, lamps, etc.; £28.—Wellboy Motor Garage, Woodford Rd., Forest Gate. [7346]

**RUDGE** Multi, 1916, 3½ h.p., C.B. combination, spares; £52/10, near offer.—H.E.C., 33, Gladstone Park Gardens, Criklewood, N.W. [7351]

**RUDGE** Multi 3½ h.p. Combination, kick start, speedometer, P.H. lamps, good condition; bargain, £32.—New, 22, Wansey St., Walworth. [7459]



## MOTOR CYCLES FOR SALE.

## Rudge.

**31** h.p. Rudge Multi, lamps, horn, speedometer, in good order; nearest £25; letters only.—Lawton, 42nd Training Squadron, R.F.C., Hounslow. [X4694]

**1915** Rudge Multi, 3½ h.p., clutch, speedometer, mechanical horn, lamps, generators, a fine machine; £45.—Wellby Motor Garage, Woodford Rd., Forest Gate. 'Phone: 309 Stratford. [7345]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1917 Rudge Multi, 49 gns.; 1914 T.T. Rudge Multi, 27 gns.; 1913 Rudge Multi, 23 gns.; 1913 T.T. Rudge, clutch, 22 gns.; 1913 T.T. Rudge, Philipson, 22 gns.; 1912 Rudge, 2-speed, clutch, 18 gns. (1) [7425]

**RUDGE** Multi, 1913, fitted for substitute, excellent condition, £33/5; Isle of Man engine model, fitted with large head lamp, and Klaxon mechanical horn, 1914 model, £30/10; Multi, in excellent condition, 1914, practically new tyres, T.T. bars, £31; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4820]

## Scott.

**COLMORE** Depots, Birmingham, and Manchester, for Scott motor cycles. [0806]

**SCOTT**, 3½ h.p.; £16, bargain; after 6 p.m.—12, Roslin Rd., S. Acton, W.3. [7482]

**1915** Scott, Lucas lamps and horn, complete; £42.—Cross, Jeweller, Rotherham. [X4788]

**3** h.p. Scott, 1913, O.B. sidecar, underslung, apron, lamps, complete, good running order; £31/10.—Harrod, 5, Skipton Rd., Sheffield. [X4709]

**1914** Scott, 3½ h.p., 2-speed, kick starter, tyres new, speedometer, thoroughly overhauled, condition perfect, lately re-named; 38 gns.—Palmer, 51, Bridge St., Workshop, Nottingham. [X4715]

**SCOTT** 3½ h.p. 1914 Coach Combination, hood, screen, side curtains, speedometer, lamps, generator, 2-speed, kick starter, Smith carburettor; £48, or near offer; evenings after 6 p.m.—M., 65, Princess Rd., Kilburn. [7307]

**SCOTT**, 1914, and sidecar, 2-speed, kick starter, 27 cyl., 2-stroke, Binks carburettor, Stewart speedometer, Palmer cord tyres; £65; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4829]

## Service.

**SERVICE**, 2½ h.p., 2-stroke Peco engine, chain and belt drive, 1915, a very reliable proposition, 2-speed, Harcourt extra cooling fins; £35; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4823]

## Singer.

**1914** 4½ h.p. Singer and Bramble sidecar, 2-speed, clutch, chain drive, tyres, as new, speedometer, 3 lamps, wind screen, complete set of spares and tools, 2 tubes and spare cover; £42.—Cable, 53, Spey St., Peplur, E.14. [7330]

**SINGER**, 3½ h.p., Brooklands model, believed to be the fastest machine of its type now in existence, very little used, and in competition condition, most unusual opportunity.—Full particulars from Tolladay Hemmingsford, Bicester. [7542]

## Sparkbrook.

**SPARKBROOK**, 1917, 2-stroke, 2-speed, unscratched, just cost £45, indistinguishable from new; £37; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4822]

**SPARKBROOK** (new), 2-stroke Villiers engine, 2-speed gear, footboards, Danid spring forks, a thoroughly reliable and attractive machine; £40; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [7471]

## Sun.

**COLMORE** Depots, Birmingham and Manchester, for delivery from stock of all models of Sun motor cycles. [0807]

**SUN-VILLIERS**, 2-stroke, first-class condition; £15.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [7561]

**SUN-VILLIERS**, 2-speed, new, £37/16; V.T.S. single speed, new, £30/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X4834]

## Sunbeam.

**31** h.p. T.T. Sunbeam, 3 speeds, kick starter, done 58 m.p.h.; £48.—Cross, Effingham Sq., Rotherham. [X4789]

**1916** Sunbeam Combination, 8 h.p. M.A.G., complete with lamps, horn, screen, in perfect condition throughout.—Below. [7464]

**1917** Sunbeam, 3½ h.p., W.O. Model, lamps, horn, in very good order; £75.—Elce and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [0551]

**1915** Sunbeam and Sun sidecar, Lucas accessories, 3-speed, hand clutch; £65; any expert examination.—Eccles, 21, Hawksworth Rd., Sheffield. [7386]

**SUNBEAM** 6 h.p. Combination, Gloria sidecar, completely equipped, late 1914 model; £65.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [7263]

**1916** Sunbeam, 3½ h.p., black, gold, 3-speed, h.b.c., 2 lamp sets, Lucas horn, Brooks corner case, with No. 1 Sunbeam sidecar, 783 miles only, perfect condition, as new; £90.—Robinson's Garage, Green St., Cambridge. [7465]

## RIDER TROWARD &amp; Co.

## SELECTION FROM STOCK.

## New 1917 Models.

**ALLDAYS ALLON, COVENTRY EAGLE, JAMES, NEW IMPERIAL, ROYAL RUBY, and ROVER.**

## Lists free.

## Second-hands.

<b>BROUGH</b> , 1916, 3½ h.p. twin, Sturmey countershaft gear .....	59 gns.
<b>DOUGLAS</b> , 4 h.p., 3-speed, coach Sidecar .....	59 gns.
<b>ENFIELD</b> , 1916, 2-speed, 2-stroke .....	27 gns.
<b>EXCELSIOR</b> (American), 7-9 h.p., 3-speed, dynamo lighting, coach Sidecar .....	69 gns.
<b>ENFIELD</b> , 1915, T.T., 3 h.p., 2-speed .....	32 gns.
<b>F.N.</b> , 7-9 h.p., 4-cyl., 3-speed, coach Sidecar, mileage 4,000 .....	73 gns.
<b>HARLEY - DAVIDSON</b> , 1915 Standard, 7-9 h.p. Combination .....	65 gns.
<b>INDIAN</b> , 1916, 2-stroke, 2½ h.p., 3-speed, clutch, kick-starter, as new .....	37 gns.
<b>INDIAN</b> 1916 Powerplus coach Combination, 7-9 h.p., 3-speed .....	78 gns.
<b>INDIAN</b> , 1915 T.T., 7-9 h.p., clutch .....	39 gns.
<b>JAMES</b> , 1917, de Luxe Combination, Lucas dynamo lighting .....	79 gns.
<b>LEVIS</b> , 1915, 2½ h.p., 2-speed .....	26 gns.
<b>O.K.-J.A.P.</b> , 1916, 2-speed .....	28 gns.
<b>PREMIER</b> , 1915, 7-9 h.p., 3-speed, 30 gns.; with coach Sidecar .....	59 gns.
<b>DOUGLAS</b> , 1914, T.T., 2-speed, perfect .....	35 gns.
<b>RUDGE</b> Multi, 1917, as new .....	49 gns.
<b>RUDGE</b> Multi, 1914, T.T. model .....	27 gns.
<b>SCOTT</b> , 1915, coach Combination, as new .....	55 gns.
<b>TRIUMPH</b> , 1914, 4 h.p., 3-speed .....	38 gns.
With coach Sidecar .....	47 gns.

*All Machines Sent on Approval.  
"Motor Cycle" System if desired.*

'Phone 5392. Open 8 p.m. and Sundays.

**31 & 78, HIGH ST., HAMPSTEAD.**

## MOTOR CYCLES FOR SALE.

## Sunbeam.

**SUNBEAM** 1915 Combination, 6 h.p., fully equipped, mirror, Cowey speedometer, perfect condition, 1,906 miles.—Morse, 37, Replingham Rd., Southfields, S.W. [X4802]

**1915** Sunbeam, 3½ h.p., black, gold, 3-speed, h.b.c., latest equipment throughout, mechanically perfect, excellent order; £60.—Robinson's Garage, Green St., Cambridge. [7464]

**SUNBEAM**, 3½ h.p., 1917, service green, £15 sidecar to match, all accessories, 2 spare valves, tyre, 2 tubes; £90, no offers.—Aitchison, 8, Lancaster Rd., Birkdale, Southport. [X4802]

**1916** Sunbeam, 3½ h.p., black, gold, 3-speed, h.b.c., 2 lamp sets, mechanical horn, with Skiff Millford sidecar and storm apron, 1,000 mileage, new condition, £87/10.—Robinson's Garage, Green St., Cambridge. [7463]

**SUNBEAM** 1914 3½ h.p. Combination, 3-speed, hand clutch, Canoelet Skiff sidecar, Lucas lamps, speedometer, watch, exceptional condition and speed; £66/10; seen London.—Lacking, 19, Bridge St., Leighton Buzzard. [7546]

**1916** 8 h.p. M.A.G. De Luxe Model Sunbeam Combination, perfect, Lucas dynamo lighting set, electric horn, speedometer, spare wheel, tyre, new tyres, wind screen; 120 gns.—Box 1,193, c/o The Motor Cycle (1). [X4771]

**SUNBEAM**, genuine 1917 3½ h.p., 3-speed model, with kick starter, semi T.T. bars, Lucas accessories, speedometer, ridden approximately 500-600 miles only, quite as new.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7419]

**LATE** 1915 Sunbeam Combination, 3½ h.p., Splendid, B. and B., new July, electric lighting, 3 bulbs, 2 accumulators, Lucas horn, 1 spare outer, 3 spare inner, timepiece, Stewart speedometer, Oris triple sliding screen, knee-grips, luggage carrier, 3 aprons, tools, mirror, 9 months' insurance; £80, complete; want to buy 5-seater, 1916-1917.—Johnston, Seddon House, Garston, Liverpool. [X4765]

## T.D.C.

**De Luxe T.D.C.**, 1916, 2½ h.p., just been overhauled; £25.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7189]

## Triumph.

**3** h.p. Triumph, Grade gear, fine order; £12/15.—373, Katherine Rd., Forest Gate. [7447]

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**TRIUMPH**, 3½ h.p., 1913, 3 speeds, in real good order; £33.—Percy and Co., 337, Easton Rd., London. [7572]

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**TRIUMPH**, 1913, 3½ h.p., 3-speed, sidecar, hood screen, grid, good tyres; £37.—108, Greenfield Rd., Harborne, Birmingham. [X4544]

**1911-1912** T.T. Triumph, in splendid order, fully equipped; bargain, £17/10.—Appleton, 32, High St., Harlesden, London. [X4861]

**1914** 4 h.p. Triumph, 3-speed, good tyres, excellent condition, 2 lamp sets, horn; £42.—Robinson's Garage, Green St., Cambridge. [7467]

**1912-13** Triumph, 3½ h.p., 2-speed, free engine, in good order, lamps, horn; £23, near.—J. Davidson, Stuartfield, Mintlaw, Aberdeenshire. [7305]

**TRIUMPH**, 1910, 3½ h.p., with Brampton gear, £19/10; 1911 3½ h.p., spring forks, £22/10.—Motor Exchange, Horton St., Halifax. [7083]

**BABY** Triumph, as new, Lucas set, Bosch, Clincher and Dunlop; £52. Wanted, 4 h.p. Triumph solo.—Lawley, 68, Market St., Penzance. [X4355]

**1911** Triumph, 3½ h.p., 2-speed, Bosch mag., free engine; £16.—Tobaccoist, Railway Approach, Tadworth, Surrey. 'Phone: 242, Burgh Heath. [7232]

**TRIUMPH**, late 1913, T.T., specially tuned, excellent condition; great bargain, £23.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [7500]

**TRIUMPH**, 3½ h.p., Sturmey-Archer 3-speed, with Dement coachbuilt sidecar, P. and H. lamp, Lucas horn, good condition; £32.—Freestone, Grocer, Littleover, Derby. [7439]

**TRIUMPH** (late 1914), 4 h.p., clutch, Philipson, Binks, speedometer, runs on paraffin, splendid condition, unused 18 months; £38.—Hole, St. Catherine's, Mids., Hants. [7330]

**TRIUMPH**, 3½ h.p., carefully used, cylinder ground, new piston, tank re-enameled, semi T.T. bars, new belt, lamps, horn, spares; £24/10, offers.—48, Derwentwater Rd., Acton. [7349]

**TRIUMPH**, 1914, 4 h.p., coachbuilt sidecar, perfect throughout, Lucas horn, speedometer, spare tubes, and accessories; sacrifice £37.—Fellows, Victoria Villa, Stanningley, Leeds. [X4528]

**TRIUMPH**, with sidecar, 3½ h.p., mag., 2 speeds, Lucas large head lamp; any trial; £25; exchange arranged.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [7601]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1914 4 h.p. Triumph, 3-speed, 38 gns. with 1916 coach sidecar 47 gns.; 1913 T.T. Triumph 23 gns.; 1913 Triumph, clutch, 23 gns.; 1911 standard Triumph, 16 gns. (1) [7421]

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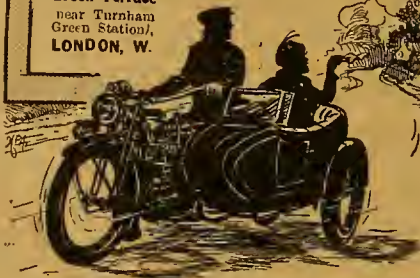
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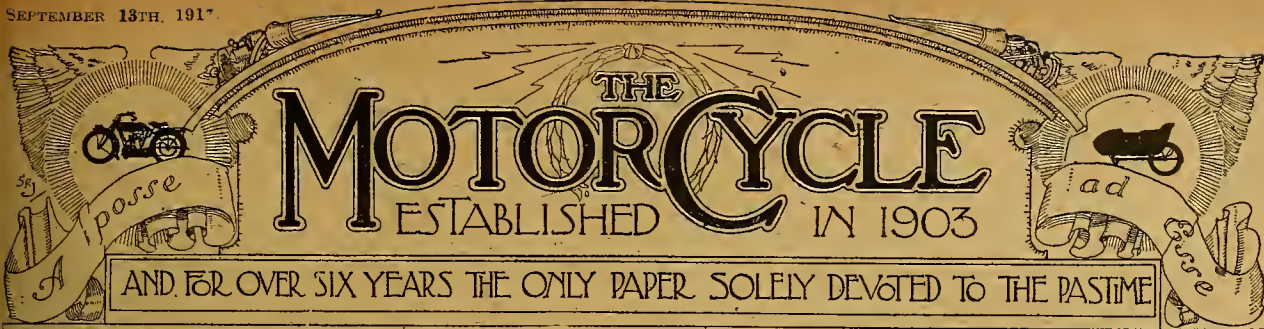
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## Motor Cycling and Moral.

**W**E have always affirmed that motor cycling has a healthful effect not only upon the body but on the mind, as it teaches the rider judgment, patience, and self-control, while it sharpens his wits and strengthens his nerves. We are very glad to note that this view has now been taken up in two papers in two different countries.

Glancing through that excellent publication, *L'Automobile aux Armées*, the other day, we found a special article devoted to this very subject. Commenting on the fact that the Germans at the beginning of the war counted on the nervous temperament of the French, the author of the article points out that they had forgotten the education of sport—the results of which were present in the new generation—which developed calmness of mind and *sangfroid*. The article indicated that the excitable Frenchman at the beginning of the motoring movement did not realise that one could not adjust a magneto by kicking the crank case in a temper when the engine stopped; consequently the driver was taught patience, became resourceful, and the next time the engine gave out he would quietly set to work and eventually get going again.

We now come to an article appearing in a daily paper which has not been kind to the motoring movement either on the occasion of its inception or during the war. The article in question, however, is calculated to do a considerable amount of good to the motor cycle movement. It deals with a case of several nurses who journey daily to a V.A.D. hospital in the depths of the country, the commandant of which is thankful that four of the nurses and a quartermaster have motor bicycles which enable them, though they live five miles away, to attend punctually. Further, a case is given of two girls living in the country who are engaged on important war work, who state that they could not continue their jobs—in fact, could not have undertaken them—if they had not possessed

motor cycles. These particular girls live eight and six miles from their work, right off the railway track, and neither of them could face the double journey on an ordinary push cycle, while no pony could do it regularly.

*The Motor Cycle* is well in touch with the movement from the ladies' point of view, and articles frequently appear showing the utility of the motor cycle in feminine hands and the excellent results obtained with it, but the article to which we have referred further encourages the adoption of the motor cycle by women. "Some women," it states, "who are attracted by the idea, fight shy because they think a motor cycle is too heavy for a woman to propel without endangering her strength, and too intricate to use or understand. That is quite wrong; the present-day simplicity of machines is such that the superficial intricacies can be grasped by any average woman. Mechanical mishaps may occur, but a woman can easily learn to remedy the minor troubles . . . and it may be remembered that but few men motor cyclists understand everything about their machines."

"For the rest, a motor cycle teaches a girl or a woman much that is good. It really creates a far better *moral* than push cycling. Motor cycling gives a girl a healthy and wholesome independence, and inculcates reliance and resource, while developing powers of patience and broad commonsense."

As we have stated above, we have always maintained that this is so, but it is unusual to see such enlightenment in a daily journal.

This now forces us to hark back to the subject of our leader in the issue of August 30th, when it was pointed out that it was essential that a limited quantity of petrol should be allocated to motor cyclists for their own use, because as the demand for motor cyclists engaged on war work increases, as it is bound to do, it is essential that experience should be obtained somehow, and naturally experience cannot be got without the necessary fuel.





## Life and the Open Road.

*Pleasant it is to hear the swish  
Of the water round your boat,  
Or in flannels cool in some still pool,  
To drift and laze afloat.*

*There's joy in swimming with crestless waves  
Where the tide runs deep and wide,  
And there's life away in the swift short sway  
Of a horse's steady stride.*

*But there's joy of life in the open road,  
The road that is unknown too,  
Where the endless wind that is seldom kind  
Can kiss you or cut in two.*

*A boat will rock as the sea gets strong,  
And the crested waves turn cold;  
They buffet and beat—and a horse's feet  
Grow tired—a horse grows old.*

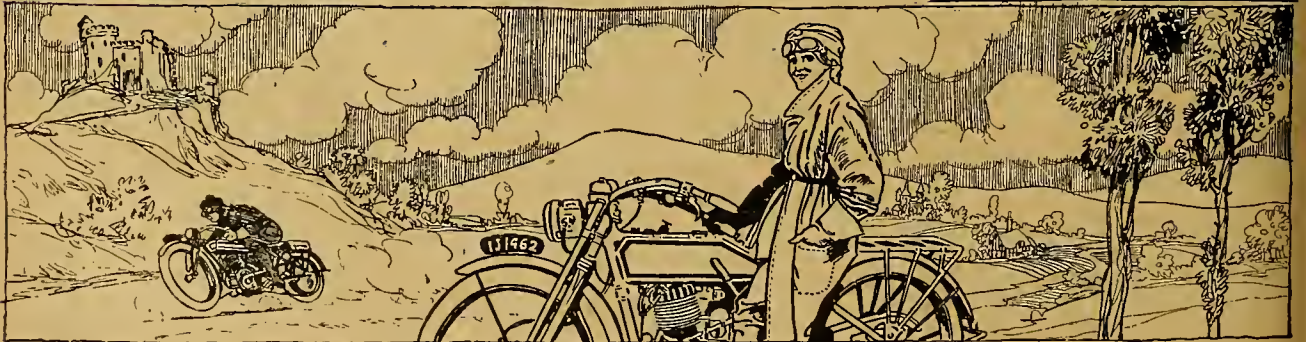
*But with grease and oil and a little time  
Your bike is a friend that's fair;  
On valley or hill it is faithful still,  
And it always gets you there.*

*You cross the glare of a summer sun,  
You bow to the slash of rain,  
But never you find in storm or wind  
That you've given your care in vain.*

*Ah, me! the streak of the long white road  
Where the tall, dark trees flash by,  
And the heat of the day gets wiped away  
With the dusk of a twilight sky.*

*And the moon comes up from a dewy haze,  
And the damp air lends you power,  
You know you can do—the whole night  
through—  
Your thirty miles per hour.*

SOPHIE ELIOTT LYNN.







### Some Old Scandals.

THE conservatism of designers in so simple an accessory as a motor cycle stand has long been one of the blots on the industry. A great deal of pen-pricking was necessary before the trade was induced to abandon in the earlier days a triangulated girder abomination, the top of which normally carried the luggage, but was let down to serve as a puncture-repairing stand after the luggage had been removed and stacked by the roadside. This was in due course succeeded by another abomination, to wit, a stand consisting of two separate legs, attached to the chain-stays by bolts and nuts. I always carried a few spare bolts and nuts, as they littered the road on every long run. Two separate operations were required to hoist the machine, and the stand was only usable on a level surface, even supposing the legs did not bend. When sound presswork produced the scrapping of this crude notion, the trade refused to fit an automatic catch on the tail of the back mudguard, and after one had wheeled the machine off the stand, one had to walk back again to screw up the catch.

### Some Modern Needs.

THERE have, of course, been humorous interludes. There was the inventor who tried to popularise motor cycling by patenting a stand which was hauled up with the engine running, so that machine and rider were projected into sudden forward motion, with subsequent injury to the road, the machine, and the rider; he vanished when the free engine came along. Then there was the genius who invented spread-eagle side wheels, alleged to prevent skidding, and capable of being used as a stand. But, generally speaking, present-day stands are pretty good. It is true some makers still fight shy of the fly-up stand, which locks itself, and doesn't ask for a spring catch at the tip of the back mudguard; presumably, their mudguards are too heavy, or their stays too weak, so that the extra support of the stand is welcomed. Or do the Rudge people hold a genuine master patent for all devices of the kind? They are certainly streets ahead of other patterns. I think the crying need that survives our slow and clumsy evolution in this respect is a stand which will relieve users of the labour of hefting a heavyweight several inches into the air; this labour is one of the factors which have popularised the still somewhat erratic baby two-stroke. For this reason I seized with avidity on an American advertisement, depicting a slim rider hoiking a 12 h.p. twin on to its hind legs with his little finger. Underneath was the legend, "It's the roller mechanism that does it!" I put my microscope on the photograph in eager search for the details of the aforesaid "roller mechanism," but could perceive nothing of the sort; the idea

appeared to consist of a stand possessing a base sloping up towards the front of the machine in a gentle curve, so that if the owner puts his toe against the back of the stand, and pulls at the carrier with his hands, the base of the stand acts like an inclined plane. The notion may be an improvement, but I question whether the average man will find it enables him to tweak a big twin up with his little finger. Anyhow, the designer concerned has a keen eye for an aching void. Is it beyond the wit of man to devise better stands for heavyweights? Many a modern heavyweight scales nearly 4 cwt., and in many cases the weight of a sidecar is super-added. Men of over 45 are liable to serious injury in the attempt to raise such a load. If it is impossible to devise such a stand; the need would be partly met by the fitting of an auxiliary prop-stand, intended for use when the machine merely needs propping, and not lifting, leaving the existing fittings in reserve for puncture repairing and so forth. But it should not be difficult to invent a pedal lever stand which would fill the bill.

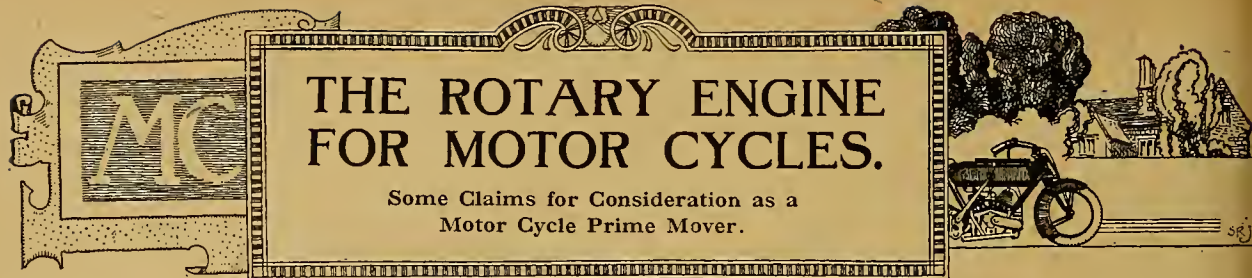
### The W.D. Oiling System.

ONE of my great disappointments as a motor cyclist was the refusal of the trade to follow the lead set it by Messrs. Wartnaby and Draper, when they brought out a motor cycle with a rational lubricating system. Readers may remember that a sump beneath the engine carried sufficient oil for several hundred miles: this was circulated by a pump, and the engine was accurately oiled: its plugs never sooted: the oil consumption was low: the crank case kept spotlessly clean: and the rider had no demands made on his memory or skill. I sighed for a W.D. machine this week, when I had to ride in succession three typical British machines, none of them too familiar, all throwing the onus of accurate oiling on the driver, and all oscillating between the twin nuisances of a hot bearing or a sooted plug. Readers know that I am not on principle an indiscriminating admirer of American motor cycles, and consider they enjoy a far greater popularity in this country than they deserve. But on this point at least they have us whacked. You can get on most Yankee bicycles and leave them to oil themselves. On the average Britisher, unless you stick to one machine and one brand of oil, you are perpetually wondering how long ago you put in that last charge of oil, or how many drops are really percolating per minute behind the miserable little greenery-gallery window of the so-called sight gauge.

### Address Wanted!

WILL the B.E.F. correspondent who recently sent me a long anonymous screed on valve timing (for which I am very grateful) kindly forward his name and address to me in confidence?





## THE ROTARY ENGINE FOR MOTOR CYCLES.

Some Claims for Consideration as a  
Motor Cycle Prime Mover.

**B**EFORE the war the rotary engine occupied a doubtful position before the public, at least nine-tenths of whom believed all such engines to be a species of jig-saw puzzle, kept running by the united efforts of specially trained engineers; while the rest, seeing that the majority of special performances in the air were done by rotary equipped machines, desired the immediate application of the type to motor cycles, without pausing to consider the difficulties, or ascertaining any details whatsoever of the machine.

During the war, however, many hundred ex-motor cyclists have taken places in the rank and file of the R.N.A.S. or R.F.C., and in so doing have come intimately in contact with that strange yet wonderful machine, the rotating engine. Now there are many great advantages which may be gained by using a rotary, and these advantages are:

Firstly, the multi-cylinder engine is much smoother than the more common two or four, not only when all goes well, but also when the engine is inclined to misbehave, because the irregular firing of one cylinder out of nine is much less disconcerting than trouble with one cylinder out of two, in engines of the equal c.c. This smoothness of running is not imaginary, and is a very real advantage, but it depends entirely on the care used in manufacture. Yet it is as easy to make a badly balanced rotary as it is a bad engine of any other type.

Flexibility is another strong advantage not brought much to the fore until recently, because, in the past, aeroplane pilots have not worried much about speed variations in the air, but were content if the maximum of 1,200 was maintained. Now, however, a good rotary can run quite slowly, and a motor cycle rotary having an ordinary carburetter would obviously prove the most flexible of all. Since flexibility is a very great advantage for motor cycle work, here the rotary gains.

Needless to say, the lightest engine for a given power is a rotary or a radial. But the radial still has certain defects of cooling and lubrication from which the rotary has been freed.

Against the multi-cylinder rotary one often hears urged the argument that the average

man could not deal with the complication of so many cylinders, and would be lost should anything occur; yet it is a fact that the seven or nine-cylindereed aeroplane rotary is one of the simplest things to strip that any man could desire, and a 100 h.p. engine, say, can be taken down while one of the normal type still is puzzling its owner. Every piece of the "inside" can be removed, inspected, or replaced in what appears to be a miraculously short time.

### Locating a Misfire.

It is quite easy to ascertain correctly which of fourteeen rotary cylinders is missing if that missing is regular, but it must be admitted that irregular misfiring is a curse to the uninitiated, while offering some small trouble even to the skilled mechanic.

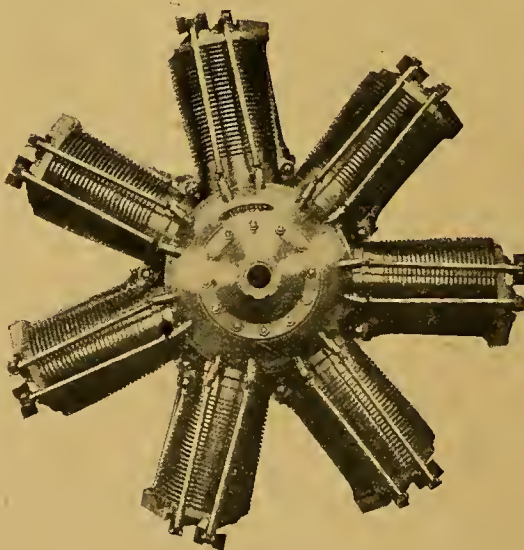
Cooling troubles, the bane of the old steel cylindered Gnome, can be overcome until the rotary keeps quite as cool as the stationary water-jacketed machine, while with this advance the reliability has become such that an engine of this type can be used exactly as the ordinary one-lunged thumper, whose ever-ready propensities have been so much admired in the past.

Silencing, against which problem many people have failed, is a purely mechanical difficulty, and in an engine of such small diameter as would be a motor cycle rotary, presents fewer difficulties than one would imagine. Inlet piping is now common, and if due care be exercised to avoid some of the pitfalls set up by centrifugal force, exhaust piping could be installed with but a small loss for extra wind resistance.

A change gear, with, say, two or even three ratios in the drive, lends itself to the rotary installation, and would be necessary, since the additional problems, which arise as the rotational speed increases, are sufficiently worth avoiding, by keeping down to, say, 1,500 r.p.m.

Now, few people realise that one horse-power can be obtained for, roughly, 100 c.c., and that a nine-cylindereed motor cycle rotary might well have a bore of 40 mm. and a stroke of 50 mm., the total diameter of the complete engine being in the neighbourhood of 12 in.

This would mean a compact engine if the magneto could be accommodated, but this



The seven-cylinder Clerget rotary engine, which has mechanical exhaust and inlet valves and a separate inlet pipe from the crank case to each cylinder.



**The Rotary Engine for Motor Cycles.—**

magneto is not so easy to fit as might be thought, and only a train of gears would bring it into an accessible position without greatly increasing the total breadth of the engine.

Certainly the carburetter would project, but this would not be more so than in the case of the present Douglas, and the Douglas is none the worse for it, nor is it more uncomfortable to ride. Obviously, the engine should be slung longitudinally in order to be protected should a fall occur, and if the rotational speed be kept comparatively low the gyroscopic effect of the engine would not be noticeable when steering, as it would take a heavy weight revolving very fast to influence the balance of the motor cycle. There is a possibility that a transverse engine might be worked in for sidecar machines, as here the engine would not be likely to sustain damage from frequent falls.

Probably the Le Rhône system of valve gear with push and pull rods would make the most compact engine if the valves were placed in the head of the cylinder, while the Le Rhône connecting rod arrangement also seems desirable. One set of plugs is all that would be required, and the ignition advance pre-

sents no real difficulties, and certainly would assist slow running. A better forced oil system could be arranged in order to bring down the oil consumption which, in this type of engine, is high, but it must be remembered that oil consumption per b.h.p. hour is at present unnecessarily high on all motor cycles in any case.

**Summary.—**

Summing up, therefore, one gains accessibility, power for engine weight, smooth running, flexibility, and more even cooling, while the difficulties to be solved are compact installation, particularly of the engine's components, adequate inlet and exhaust piping and lubrication systems—all of which are purely mechanical problems.

Petrol consumption has been high for aeroplane engines, but need not be so if the machine be arranged for motor cycle work, and with a motor cycle or small car type carburetter. Therefore it would seem worth while for designers to pay great attention to this type of engine, with a view to its installation on the machine, for that blissful period which will succeed Armageddon. S.H.D.

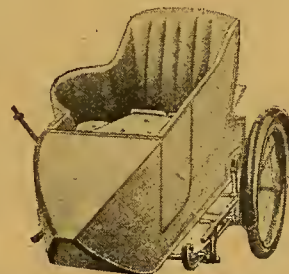
## A FAMILY SIDECAR.

### A FULL COMPLEMENT FOR A SINGLE-CYLINDER.

TO owners of sidecars who are family men, the following brief description of a particularly roomy sidecar may be interesting. The portion of the sidecar body nearest the machine is bowed to

allow for a child's seat, and Mr. P. F. Warner, speaking from actual experience, says this design is admirable in every way. One may question whether this form is superior to the tandem seating, which is the usual method of carrying a child. The chief advantage is that the child can be snugly seated in the little "annex," and another carried on the knee or seated tandem-wise, should one, of course, be the fortunate owner of a pair of these young enthusiasts.

The photograph shows that the idea is practicable, for there are "five up" on the outfit without creating an appearance of overloading. The sidecar—which is made by the "Willowbrooke" Co., Leicester—has an extension at the rear forming a capacious locker. One drawback, we should imagine, is the close proximity of the passenger in the "annex" to the driver's elbow.



The "Willowbrooke" sidecar, showing arrangement of the seating accommodation.



A  $4\frac{1}{2}$  h.p. Harley-Davidson, to which has been attached an exceptionally roomy sidecar. Not many light cars could take a bigger load more successfully. Besides the four passengers there is a loaded locker and portmanteau carrier.

### A NECESSARY SAFEGUARD.

PRACTICALLY every motor cyclist who dabbles in the second-hand market has experienced difficulty in ascertaining the date of manufacture of the machine he has contemplated purchasing. Constantly we receive letters from readers complaining that they have been misled as to the year of manufacture of second-hand purchases; and in these days, when practically no alterations have been made season

by season, it becomes vitally necessary for makers—in their own interests, in addition to the interests of their *clients*—to adopt some means whereby the date of manufacture of their products can immediately be ascertained. The easiest and best method is, of course, to stamp the crank case, as is done by the Triumph, Velocette, and other makers. This would remove the doubts of both seller and buyer.



# DARTMOOR AS A TOURING GROUND

Some Account of the Roads, Beauties, and Antiquities of South Devon.

By H. TAPLEY-SOPER.

(The first instalment appeared on August 16th.)

THE initial twenty miles of our second Dartmoor tour takes us over a course which will be very familiar to riders in the reliability trials of pre-war days. We again quit Exeter *via* Fore Street, but on passing over Exe Bridge turn sharp to the left and soon desert the treacherous tramlines. A few yards after passing under the second railway bridge should be noticed, on the right, "Mile End Cottage," which in 1839 the immortal Charles Dickens rented for his mother and father, and where he is supposed to have written certain chapters of "Nicholas Nickleby," and perhaps of "Martin Chuzzlewit," for several of the characters in these books have been identified with local celebrities.

Alphington Church, standing well above the road, is next passed on the left, and we open out for our first rise and fall, and soon find ourselves negotiating a tricky descending right and left-hand turn which suddenly introduces us to Kennford. The "ford," which, as far as we know, is invisible, must be near, for we swerve to the right and pass across a little bridge with a nasty approach. If the dust at this point allows one to make quite sure that the village policeman is off duty, it is as well to advance the throttle for a rise of nearly three miles to Haldon Down. Telegraph Hill, the local terror in fixed gear days, is passed on the left, and when the turnpike cottage comes into sight it is well to drop into second gear to negotiate a blind right-hand sweep, which should be taken with care, accompanied by a violent horn obligato to warn descending traffic.

From the cottage the steady rise to the top gradually opens up one of the finest panoramic views in Devon. Exeter, six miles off, lies 800ft. below, spread out, as it were, for inspection. The river, the Cathedral, and other public buildings can easily be spotted, and Exonians out for a short Sunday morning appetiser are wont to while away the time before descending to Chudleigh to "get the correct time" by endeavouring to locate their respective abodes in the "ever faithful" city.

## A Primitive Telegraphy System and a Duel.

Telegraph Hill derives its name from the fact that it was the site of one of the towers set up on eminences in 1806, at a distance of about ten miles apart, for a system of signalling from the Admiralty to Plymouth. In its original form the apparatus used consisted of six shutters pivoted in two frames, and



Powderham church, surrounded by the exceptionally fine yews, which are worthy of note. In the foreground are three Enfield and two A.J.S. outfits.

by opening and closing them a combination of some sixty words, or groups of letters, could be signalled. The signallers were provided with telescopes. A despatch of ordinary length from Plymouth to London took about seventy minutes to transmit, which in those days was considered something of a feat. Apart from fine scenery, the only thing the "Top of Haldon" can boast of is a racecourse, said to be the most elevated and picturesque in England.

It was near this spot that the last duel in England is said to have been fought in 1823 by two Exeter gallants. As usual, the *casus belli* was one of the fair sex. The grave of the one who did not participate in the coffee can be viewed in St. Sidwell's Church, Exeter. At Chudleigh, the next village, is the seat of Lord Clifford of Chudleigh, surrounded by a well wooded park. There are also some interesting caves here and some eleventh century remains of a palace of a former bishop of Exeter.

At Chudleigh Knighton we branch to the right for Bovey Tracey, two miles further on. The fifteenth century church of Bovey, built, it is said, by William de Tracey in expiation of the part he took in the murder of Thomas à Becket, contains a fine screen with painted figures and a pre-Reformation lectern which, during the Commonwealth period, was buried on the heath to save it from Fairfax's iconoclastic troops who were busy in the district. The Dolphin Inn, in the centre of the town, is associated with the story of the surprising of the King's troops on December 26th, 1645. The Royalists suspected no danger. A quiet game of cards was in progress when suddenly Cromwell and his men appeared under the windows. The officers pitched the stakes out of the window and escaped by the back door while the troops were busy with the scramble.

Bovey is at the foot of one of the Moor's ladders; the rise of nearly four miles to Haytor (1,491ft. above sea level) is continuous, and in places severe. As the top of the hill is approached there will be noticed on the right the remains of the stone lines of the "Granite Railway," by which the granite quarried at Haytor for the building of London Bridge was con-



**Dartmoor as a Touring Ground.—**

veyed to Bovey." Haytor is the best known of the Dartmoor crests, and can be distinguished from all parts of the county. Near by is the modern Haytor Rock Hotel. Those in quest of a more modest "pub" should enquire for the picturesque village of Haytor Vale, which is hidden at the back of the hill a few hundred yards off, and is approached by a steep rough lane entered through an iron gate erected to prevent the semi-wild moorland ponies and other cattle from straying into the cultivated lands. The descent to the Haytor Rock Hotel is quite safe if taken in low gear.

**The Art of Opening Gates.**

Leaving Haytor Rock we pass through what the moor people call "White Gate," shown on the map as Hemsworthy Gate. We feel quite sure that it is only necessary to mention that the many gates which abound on the moor are maintained for the purpose of keeping cattle within certain limits to secure the farmers from the

and many of the congregation injured. The monument of Roger Hill, who was killed, can be seen in the church, while another man who escaped death is recorded to have received such a dose of electricity that it melted the money in his pocket. Readers of "Christowell" will doubtless remember that Blackmore refers to this notable storm. Near the church are some picturesque sixteenth century almshouses.

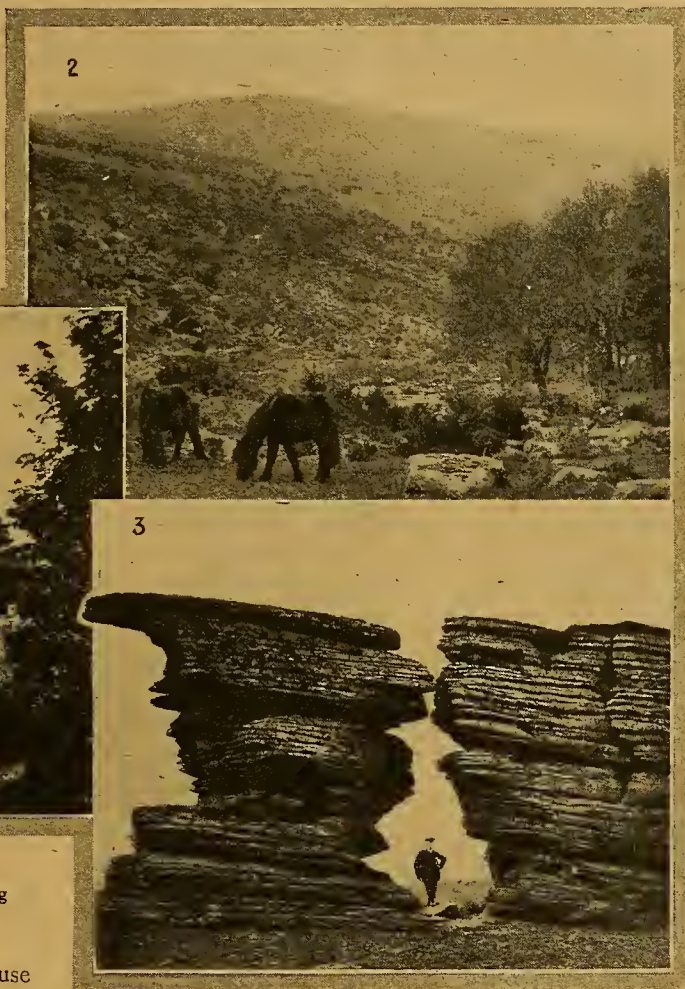
Half a mile behind the church is the hamlet of Venton, where, sprouting out from a picturesque and glorified wayside farmhouse, is a Roman Catholic



- (1) The picturesque Dartmoor village of Widdecombe.
- (2) Typical Dartmoor. Semi-wild ponies midst a desolate-looking scene.
- (3) Dartmoor rocks, showing effect of weathering.

annoyance and trouble which neglected gates cause them. Some of the gates swing to and fro without fastening; these can, after a little practice, be opened with the aid of the front wheel and a walking stick manipulated from the sidecar, but it requires some dexterity, and is accompanied by a certain amount of risk.

After having carefully closed the White Gate proceed straight ahead down a really steep hill into Widdecombe-in-the-Moor, the church tower of which will have already been observed. This church, which is unusually spacious for a village, is known as the Cathedral of the Moor. An interesting but somewhat "tall" tale, which is set out in verse painted on boards fixed in the church porch, relates to a violent thunderstorm which broke over the district on a Sunday in October, 1638. The church tower was struck



Chapel. The altar light is always burning, and strangers who enter are never interrupted. It is odd to come across such a building in the heart of Dartmoor. The owner of the chapel lives in the adjoining house, and is the authoress of one of the two most interesting of modern Dartmoor novels—"The Heart of the Moor," which presents a most beautiful and vivid picture of all that is best on the moor both in the way of people and scenery. The other book which we have in mind is "My Lady of the Moor," by John Oxenham, in which the principal character is the writer of the "Heart of the Moor." This lady is certainly a most interesting study, as those who have read her book entitled "Answered Prayers" must have realised.

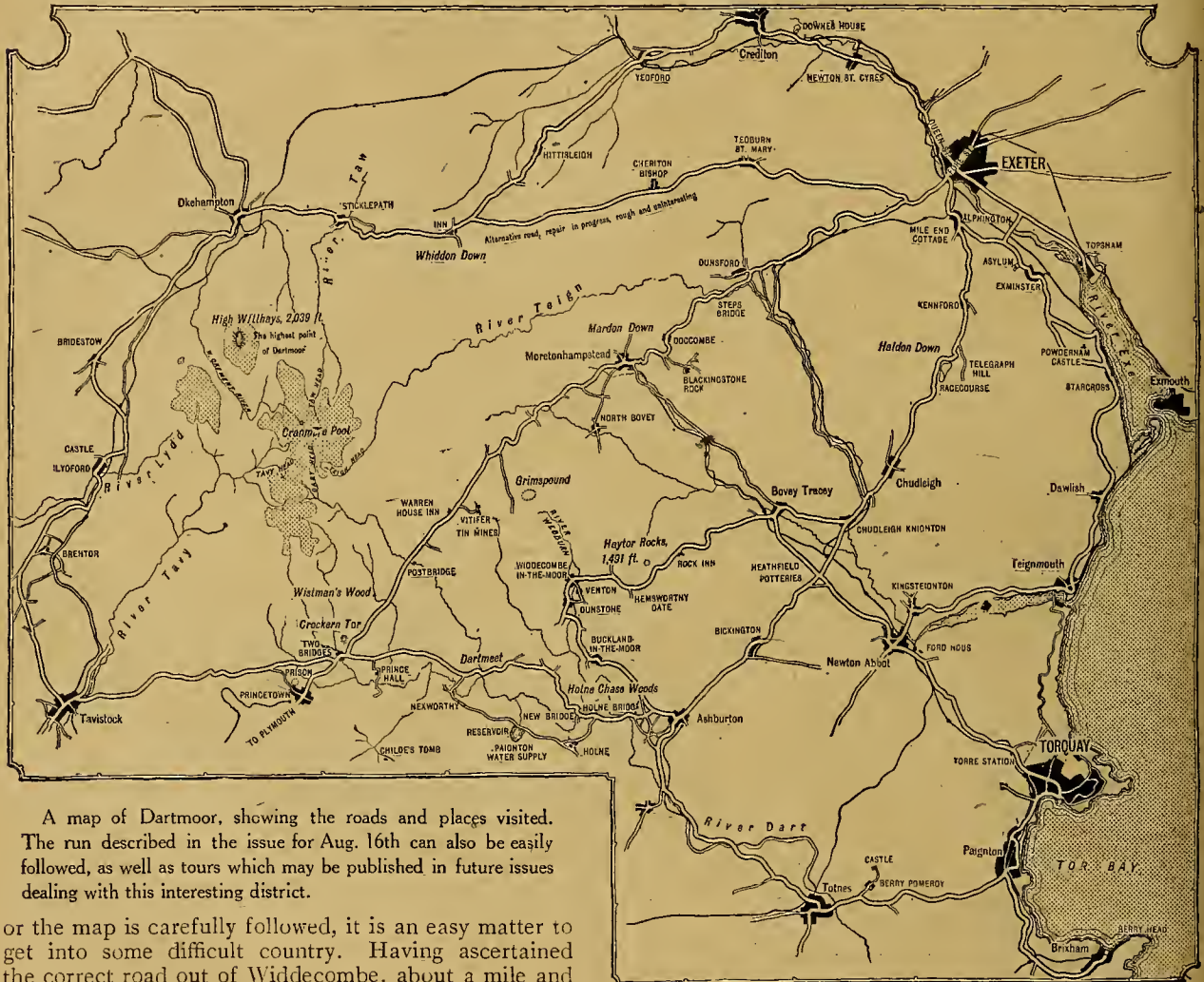


### Dartmoor as a Touring Ground —

Near by at Dunstone is a large block of granite showing several depressions in its surface, worn away, it is said, as the result of the ancient custom observed every five years by the manor tenants—commoners as they are called—placing their "head" rents thereon when they became due. From Widdecombe we make our way to Buckland-in-the-Moor, a veritable paradise of sylvan scenery. The journey from Widdecombe to Buckland is through rough and narrow Devonshire lanes of rather a complicated character. Unless explicit directions are obtained at Widdecombe,

to Exeter (twenty-three miles along the main road), thus picking up his outward trail at Chudleigh. If, however, the day is young and the flesh willing, we advise turning right on reaching the main road from Buckland. On reaching the fork, about two and a half miles on, keep left; the river which bubbles along on the right is the romantic Dart, the lower reaches of which, between Totnes and Dartmouth, are often referred to as the English Rhine.

Nearly six miles on we run into, shortly after crossing the G.W.R. line, the historic pre-conquest town of Totnes. Enter the narrow and busy main street



A map of Dartmoor, showing the roads and places visited. The run described in the issue for Aug. 16th can also be easily followed, as well as tours which may be published in future issues dealing with this interesting district.

or the map is carefully followed, it is an easy matter to get into some difficult country. Having ascertained the correct road out of Widdecombe, about a mile and a half on, take the second turn on the left—practically a right angle turn—and a mile further on be careful not to run past the Buckland Road which turns away sharply on the right. Follow the road straight through Buckland, leaving the church, which contains a Norman font, and the beautiful Holne Chase woods on the right. About three miles on take the tight-hand road of the fork and continue to the main Ashburton-Plymouth road, which is joined about two miles on the Plymouth side of Ashburton.

At this stage the tourist should consult his watch, and passenger, to decide whether he will return to Exeter by turning left and so back through Ashburton

with caution, and turn first to the right to inspect the Guildhall, which was formerly part of the Priory of St. Mary, but has been used for municipal purposes since 1553.

The parish church adjoining was built about 1430.

The street is here spanned by a chamber over the old East Gate which pierced the ancient walls, portions of which still remain, together with the ruins of the Castle. Proceeding in the opposite direction down the main street note the many fine old houses with overhanging gables, and in several instances with upper storeys projecting across the footpath. The River



**Dartmoor as a Touring Ground.—**

Dart is crossed by a noble old bridge, from and below which in the grounds of the Seymour Hotel an excellent view of the river scenery is obtainable.

From this point down to the sea at Paignton is a pleasant and easy run of six miles. Near Paignton is the famous fishing town of Brixham, which has been aptly described as a "Devonshire Wapping with a Billingsgate smell." It was here that William of Orange, who was proclaimed as the deliverer of England from the tyranny of Roman Catholicism, landed in 1688.

From Paignton we proceed along the coast to Torquay (two miles), past the remains of Torre Abbey, built in 1196 by William Brewer for Premonstratensian Canons, of which order Welbeck Abbey was the chief house in England. Follow the tramlines along the front and overlooking Tor Bay out of Torquay to Torre Station, and proceed to Newton Abbot—the New Town of the Abbot of Torre—seven miles off, and select the picturesque coast road to Teignmouth (six miles), thence on to Dawlish (three miles), and so to Starcross, situated on the western bank of the estuary of the Exe. The steep hairpin rise out of Dawlish, on the right of the garage, should be taken in low gear with great care until the right-hand turn at the top is safely negotiated. From Starcross select the road through Powderham Park and past the castle

of the Earl of Devon. On emerging from the park turn right for Exminster. On the left, a short distance out of the village, will be noted the handsome iron gates at the entrance to the grounds of the County Lunatic Asylum.

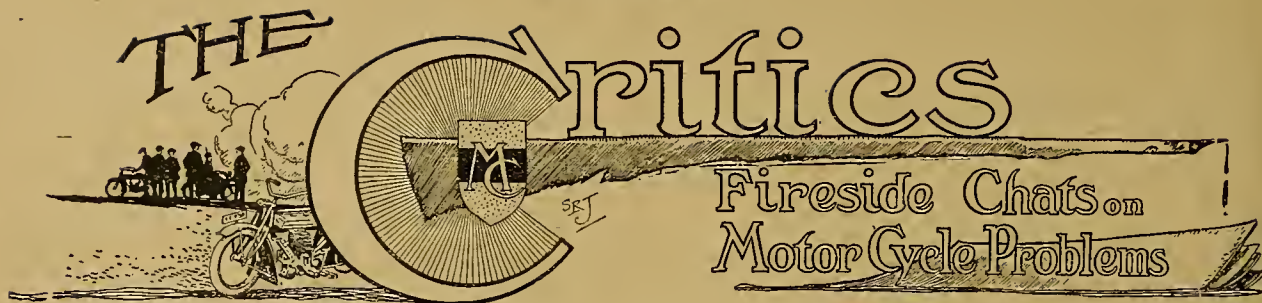
**The First Volunteers.**

It was a former medical superintendent of this institution—Sir Thomas Bucknell, father of the late Mr. Justice Bucknell—who conceived the idea, which in 1852 resulted in the formation at Exeter of the premier corps of the Volunteer Army, which Lord Haldane's territorial system abolished only a few years ago. The first turn on the right past the asylum is taken, and the River Exe crossed by Countess Weir Bridge. It is interesting to note that at this point the river, the canal (the oldest in England, having been cut in 1563), and the G.W.R. main line all follow parallel courses, passing through a typical specimen of Devonshire pastoral scenery. We next strike the Exeter to Topsham Road, turn left, and enter the city through the site of the South Gate, over which in the bad old days was the debtor's prison which Howard, the prison reformer, described as the most loathsome place in England. For diversity of scenery and interest this tour is unsurpassed in a total distance of about sixty-five miles, and we strongly advise those who can stand a long day to rise early and undertake it in its entirety.

**THE SIDECAR TO THE RESCUE.**

At many camps lorries are forbidden to enter owing to the damage they do to the roads. They are in consequence unloaded at the entrance, and frequently a long wait is the result. On a recent Sunday afternoon one of the canteens was without bread, and the photographer's Matchless was utilised and loaded up with forty loaves and run up to the canteen.





## WHICH TYPE OF SOLO MOUNT?

THE conversation had wound its course through the initial channels with unusual politeness, when suddenly the Journalist observed: "The point of discussion is this—Which type of machine do you prefer for solo use, the V twin, the flat twin, or the single? Also, what do you consider the most comfortable power for touring?"

"Oh, dry up," implored the D.R. "We have already had single *versus* twin and all sorts of things. Besides, why discuss a matter which must be obvious to everyone? Who wants an unbalanced V twin or a thumping single when the perfectly balanced flat twin is a practical proposition?"

"I do, for one," asserted the Manufacturer.

"And I for another," added the Novice. "According to 'Wharfedale,' no suitable frame has yet been devised for the flat twin, while, according to 'Ixon,' it eats up sparking plugs galore. 'Chinook' seems to experience fun with the oiling, and 'Road Rider' complains about the 'what d'you call its.' All this seems to point in the direction of the flat twin still being an expert's machine, whereas the V has been thoroughly tried, and has proved itself in public contest."

"Plug troubles and 'what d'you call its' are not inherent to the flat twin," argued the D.R. "Those allude to were probably overhead valve high speed machines, and you get plug and valve troubles with any engine of that type, whether flat or V or single. I fail to see why a low compression side-by-side valve flat twin should be any more trouble than an ordinary V."

"Well, you can have your multi-cylinder machines," put in the Manufacturer. "Personally, I haven't the time nor the inclination to fiddle with them. Give me the no-trouble single."

"My ideal," said the Novice, "is the 4 h.p. V twin on the lines of the A.J.S. for solo use, or possibly something a little smaller."

### The Small Twin and Reliability.

The D.R. said that he thought small V twins were the most unreliable and undependable little blighters on the road. He could never understand why. "They will suddenly develop some peculiarity which all the king's horses and all the king's men—Unaccountably they cure themselves, go like blazes for a time, then go on the blink again. No, above all things, save me from the small V twin."

"I have ridden one daily, winter and summer, for nearly four years," put in

the Journalist, "and have never had a moment's trouble with it."

"You're the only man yet who hasn't named his preference," the Novice pointed out. "What machine would you choose as an ideal solo mount? The Manufacturer goes for the conventional single, the D.R. for the flat twin not under 3½ h.p., I plump for the 4 h.p. V twin. What's yours?"

"Try an N.S.U. with a dash of vodka!" suggested the D.R.

But the Journalist was busy eating plums, and the matter required some thought. "I think I should bid for the 7-9 h.p. twin with a decent kick starter."

"Then you won't get anything with a decent kick starter from the States," observed the D.R., drily.

"Suppose we each put forward our special reasons for our choice," suggested the Novice. "Let the Manufacturer have first say. Why does he pick the single?"

### Single *versus* Big Twin.

"For the same reason that the Journalist picks a single when it comes to the A.C.U. Six Day or the Scottish Reliability, and he has to get through with his copy," came the prompt retort. "That's why! Because it does a maximum amount of work at a minimum of attention. Because you can neglect it at busy times without permanently injuring it. Because it maintains its tune without constant petty adjustment, and because it is the most economical machine on the road. That's why!"

"What time have I," he added, warming up, "to go fiddling with your petty-fogging little twins in these days of shell production? I want a machine which I know will start second kick when I leave the office late at night, and which I can start out on to go to Birmingham next morning without fiddling with my tappets or taking out my sparking plugs before starting. It's all rot to talk about the flat twin superseding the single! Take my word for it, the single will live on if only because it is a hard-working and honest proposition, fast enough for anyone, and not unreasonable as regards comfort. As a business mount it has no equal."

His vehemence for a moment silenced his listeners. Then the Journalist dropped a plum stone in the wastepaper basket and sniffed. "I don't know that I should choose a single for trial work to-day," he observed coolly. "I should be sorely tempted to choose something on the lines of the four-speed 90° P. and M."

"Why?" snapped the Manufacturer.

"Because it would go through the trial with infinitely less labour, and so would maintain its tune better. In addition to this it would be much less tiring to ride, capable of maintaining much higher speeds over long stretches without exertion, and would finish the trial without the necessity for a thorough overhaul before the next. I have reduced the valves of a single to absolute clinker in a one day trial, and at the end of the Six the whole engine is a physical wreck."

"But," argued the Manufacturer, "how many times have you seen those big twins fail on the test hills, simply on account of their huge weight resulting in wheel spin? How many times have you smiled at their exhausted riders, and thanked your lucky star you were on a comparative lightweight in the form of a reliability single?"

"And how many times have I cursed my single when the big twin men have swooped by me, making up time—when I have seen them ticking smoothly along the difficult patches, knowing that what they lost on the swings they could make up on the roundabouts? As regards weight, the 7-9 h.p. T.T. Indian is little heavier than a Triumph."

"No, but it jolly well would be by the time you had rendered it comfortably fit for competition work by adding a kick starter, lamps, and gear box. You can't compare a stripped machine with one in competition order."

### The Weight Question.

"That's true," agreed the Journalist, "but recent American records prove my point. Our peace-time competitions are purely endurance tests, and could any single on earth do what the Americans have recently done on their big engines? No, the engine couldn't do it, and the rider could not stick it. You cannot overwork and overdrive a machine without overworking and overdriving yourself, therefore a big reserve of power is the chief thing for comfort in an endurance test."

"Comfort!" sneered the Manufacturer. "Who can sanely describe it as comfort to be inflicted with one of these unwieldy camels as a solo mount? The average man does not wish to have to cart a superfluous bulk of weight and machinery about with him."

"No," replied the Journalist, "because the average man does not realise the wonderful docility and numerous other advantages of the big twin. In my opinion it is far better adapted as an old man's mount than the spluttering, high compression little two-stroke. It is a



**The Critics.—**

Rolls-Royce as compared with a single De Dion. It will tick over in traffic like a sewing machine; it will run slowly up hill and pick up at the merest touch of the throttle without resort to the gear change. It is a model of docility and easy driving, and—here is my point—the big twin, not the single, is truly the no-trouble machine! Because it is never overworked it requires no attention, and whereas your single requires decarbonising every 2,000 miles at the outside, the big twin will run for an indefinite period without taking down. That is one reason why the Americans stick to it—because the ordinary Yankee rider will not trouble to decarbonise his engine at regular periods."

**A Founder of History.**

There was a moment's pause. "You chaps have had your say—now let me have mine," suggested the D.R., with an airy wave of the hand. "The Novice can keep his till last. We reserve him as a kind of dramatic adjunct. Well now, I have tried your singles and your big twins. I do not despise either of them. The single has stood by me as a faithful friend in the hour of direst need—such need as I hope never again to experience. I have seen my own life-blood collect on the top of the tank, and mix with the petrol which squirted with every thump from the vent hole. I have clung to its bars when it was a labour—positively a labour—to push open the throttle, and I have sat in the saddle and eaten food, and fallen asleep in the act of raising the food to my mouth. More than all this, I have seen what none of you have ever seen. I have seen a strong man, a bosom pal, embrace his machine in the best way one can embrace a motor cycle, and blubber over it like a kiddy blubbering over his dog, because that machine had stood by him

faithfully as the best of dogs when all human help was beyond his reach. The single has done in history what no other machine can ever do, and because it has brought me, against overwhelming odds, through trial and hardship beyond belief, it would be disloyal to cry it down. But"—and the D.R.'s boyishness returned as though two decades were suddenly lifted from his shoulders—"I cannot help but think that, except as a commercial machine, the fate of the single is sealed. It will live on till the flat twin has attained a degree of reliability equal to the single, then, despite what it has done in history, what it has done for the world, it must die. In one we have the unbalanced engine, which inevitably has its 'period'; in the other we have perfect symmetry, perfect balance, and a machine which cannot help but appeal to the engineering mind as a superior article. The difficulties of housing it, lubrication, the sparking plug problem, will all die in time. That is why I think the unbalanced single and the V twin will live merely till the flat twin is developed. The V twin particularly is a compromise—a makeshift. And I tell you this, that in the next T.T. the flat twin will fairly buzz the speeds up. Now, Novice, what's your say?"

But though the D.R. had returned to his old cheery style, somehow it did not ring true. The Novice had much to say. He preferred the 4 h.p. twin because it was free from the peculiar troubles of the small twin, and for the reasons which the Journalist had outlined as appertaining to the 7-9 h.p. V, without the huge weight of the latter. It could take a sidecar comfortably. It was ideal for solo use. He regarded it as a temperate measure for the moderately temperate man.

A strange quietude fell. At length the D.R. rose, and said he thought he would go, and as his hand fell upon the table

they saw that he was wearing what he seldom wore—a single gold stripe. And, as he left them, each fell thoughtful. This man, the light-hearted, the forgetful, the whimsical, the jester—the man who made foolery of their petty troubles in life—had seen more and suffered more than they had ever realised was within the limits of human endurance.

"Poor boy," said the Manufacturer at length. He, the apparently mercenary, the rough-spoken, the unsympathetic, was the first to break the silence which signified their sympathy. He looked towards the Journalist. "He lost some good pals," he observed, "but I hoped he was beginning to forget."

**The Manufacturer as a Philanthropist.**

The Journalist shook his head. "There are things a man cannot forget," he said, quietly. "Have another drink?"

But the Manufacturer had risen. "No thanks; I'm going home."

And that night the Manufacturer did what he seldom did. He went home by back alleys, and on the way a woman, carrying a bundle—a woman who was ragged, but who muttered something about "soldier's widow"—plucked at his sleeve. He elbowed her roughly aside, then he paused, looked back guiltily, but saw no one was about. He thrust something into the woman's hand and strode on—a crumpled note, but perhaps a human life.

"God bless you, sir. Ga—if you ain't a toff—!"

"Get away from me, woman! It's a lie! You are not a soldier's widow."

The Manufacturer strode on through the gloomy alleyways, his eyes downcast, but as he went he wondered. "If she isn't an honest woman, why was she so ragged—her child so plump? A soldier's widow, and here, by Gad, am I, making shells by the thousand, and for every other shell—a soldier's widow!"

**THE DUCO VALVE SPRING COMPRESSOR.**

**T**HOUGH we have previously illustrated this little tool in *The Motor Cycle*, we do not think that it has yet been realised that it has more uses than that of a valve spring compressor. Since its introduction its inventors have discovered that it can be used for bringing the ends of a chain together, and may also be utilised as a patch compressor. Two plates provided with slot attachments are now supplied (and used in the manner shown in the accompany-

ing illustration) by means of which a patch, after it has been applied to a tube, may be compressed and held in position until the solution has absolutely set.

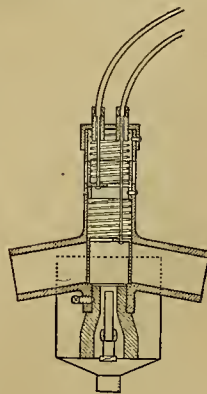
As a valve spring compressor it is of the greatest use. To employ it the valve cap should be removed and a nut placed in the top of the valve. Then the valve cap should be screwed down finger-tight, so that it presses on the nut. If the valve spring compressor be then placed in position and the handle turned the spring and its cap will be raised, thus leaving the cotter free of access.

**NOVEL CARBURETTER FOR FLAT TWINS.**

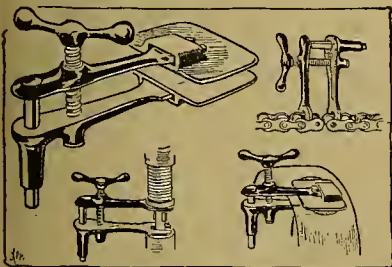
**T**HE design of carburetter here shown is the patented invention of a reader, who claims that it offers several unique advantages—slow running, economy, and rapid acceleration being among the foremost. It will be seen that the design is very simple, the jet being screwed into the tie-piece in somewhat the same manner as in the Indian carburetter, while the throttle piston occupies an unusual position at the junction of the

pipes. In this position the slide would undoubtedly be subject to more wear than in the usual position, and a worn slide thus placed would tend to upset the equality of the charges to the respective cylinders, but the possibility of such weaknesses could probably be allowed for in the construction.

The adjustable air port is contained in the barrel directly above the throttle slide, the air supply being admitted through the hollow throttle piston, thus meeting the atomised charge at high velocity and assisting in the direction of complete carburation. An ordinary float chamber is, of course, used, and the carburetter presents a very neat and compact exterior.



A patented design of carburetter for a flat twin engine.



The Duco valve spring compressor.



# THE NEW IMPERIAL MILITARY MODEL.

An 8 h.p. Sidecar Machine, built to the Specification of the Russian Government.

It has already been stated in these columns that some hundreds of machines, built in this country for the Russian Government, have been left on the hands of their manufacturers, and will probably be disposed of to private purchasers as circumstances permit. Among these is the 8 h.p. (twin J.A.P.) New Imperial, which conforms to the essential features of the Russian W.O. specification, as already referred to in our descriptions of other machines built to this order.

Though hardly ideal for solo use in this country on account of their rather high saddle position, brought about by the 28in. wheels and abnormally liberal ground clearance, these Russian machines leave little to be desired for sidecar use, possessing, as they do, several features which are highly desirable in a sidecar machine. Their totally enclosed all chain drive, h.b.c. clutch, ample power, and general solidity of construction are all points the sidecarist desires, while the mudguarding on the Russian machines is generally in the direction of an improvement.

## The Gear Box Unit.

Apart from the general design of the machine, perhaps the chief point of interest in the military model New Imperial is the transmission, for here a very wide margin of efficiency in the way of strength and durability is made. Exceptionally heavy chains ( $\frac{5}{16}$ in.  $\times$   $\frac{3}{16}$ in. front,  $\frac{3}{16}$ in.  $\times$   $\frac{7}{16}$ in. back) are used, thus ensuring long life and freedom from breakage.

The gear box, with the clutch and shock absorber, is made in the New Imperial works. The clutch is a particularly good and thoughtful piece of work, its design being as follows: It is of the dry plate variety, containing three cork plates and four metal of wide diameter. Square corks are used instead of round, it having been found that they are easier to fix in an efficient manner. The gripping surface afforded is abnormal, there being two rows of insets to

The 8 h.p. New Imperial military sidecar. Note the wide magneto shield, also the simple straight rod controls.

each plate, though in practice the clutch has been found to be more than equal to its work with only the outer ring of insets.

Tension is obtained by means of six coil springs mounted on slotted screws in the same manner as in the Sturmey-Archer clutch, but provision is made to assure the continued working of the clutch should the insets be burnt out by mishandling. The springs give the correct tension with the screws turned home, but at the end of each screw, and mounted on the thread, is an extension collar—a small round nut, as it were—which prevents the screw from entering for the full length of its thread the member tapped to receive it. Should the insets be burnt out or excessively worn, the screws are taken out and the small extension collars removed, thus permitting the screws to go further home, and increasing the pressure on the springs, and thereby bringing the metal surfaces of the plates together, so that one is independent of the insets. It would not, of course, be advisable to use the clutch for any length of time in this condition, though the adjustment serves to tide one over till the insets can be renewed. The plates are held in position by means of a large split ring, which can very readily be re-

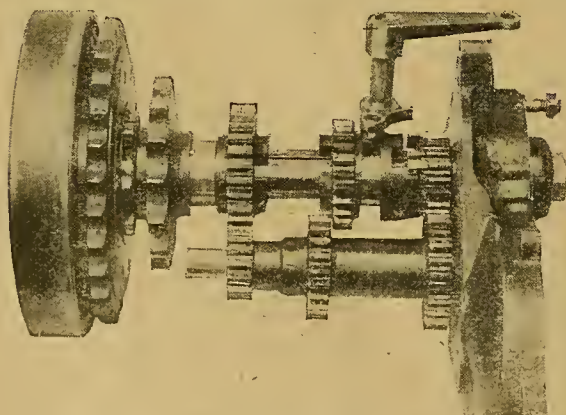
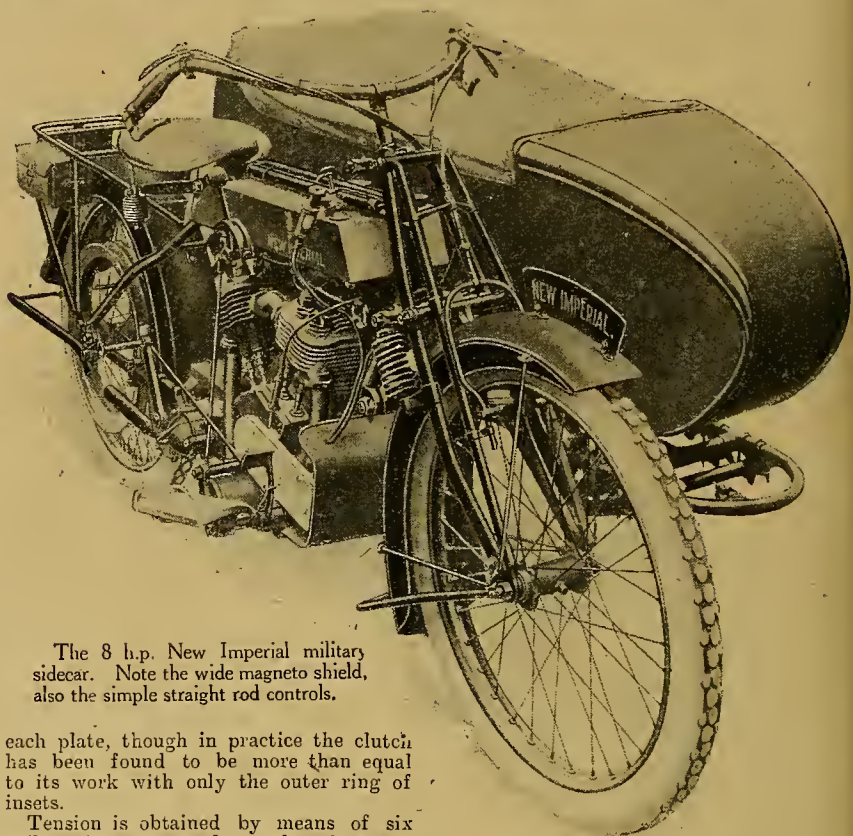
moved, leaving the clutch mechanism *in situ*.

## The Transmission Shock-absorbing Device.

The shock absorber is contained in the countershaft sprocket, which receives the drive from the engine. The toothed portion of the sprocket is mounted on a large ball bearing, and contains a series of circular rubber blocks. On either side of the toothed member, and fitting closely up to it, are plates, and between these two plates, and passing through the centres of the rubber blocks in the toothed member, are steel pins. The drive, then, is conveyed to the loose portion of the sprocket, which is free to move on its ball bearings, and is communicated by it through the rubber blocks to the steel pins, and thus to the outer plates, which are mounted on the load shaft of the gear box. The shock absorber is of very ample size, and the makers claim its shock absorbing properties to be highly efficient, while undoubtedly it occupies a good position.

The kick starter follows conventional lines, its mechanism being totally enclosed, and the gear change is by dogs on top and bottom and inter-meshing pinions on middle. It is a curious fact that the engagement of the pinions is an even simpler matter than the engagement of the dogs.

A B. and B. carburetter and Dixie magneto are fitted, the latter being



New Imperial gear box. Dog clutches are employed for the engagement of the top and bottom gears, and inter-meshing pinions for the middle gear



### The New Imperial Military Model.—

effectively sheltered from mud and wet by a wide curved sneid, which almost completely envelops it.

The wheel bearings on this machine are a fine piece of work, being of large diameter, and provided with efficient mud and water-excluding felt washers.



The shock absorber. The outside disc is insulated from the toothed portion of the sprocket by means of rubber blocks, through which the drive passes.

The oil pipe is arranged from the B. and L. drip so that, when dripping normally, the feed goes to the front cylinder, but if the pump be used the overflow is fed to the crank case in the

ordinary way, thus providing the main bearings, etc., with a deluge of cold oil.

The back carrier is so arranged that, by depressing a spring bolt, which affords it means of attachment to the saddle stay, it can be swung bodily backwards as shown in the illustration, thus leaving the tyre more accessible for repairs.

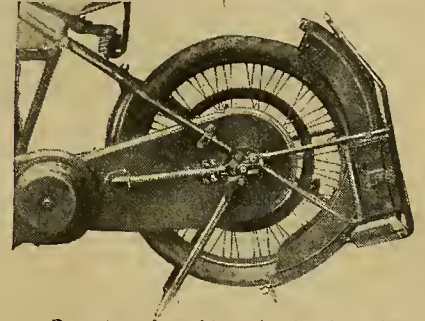
The chain cases are up to the usual standard of machines specially fitted with such in compliance with this order. They are reasonably simple to remove, and do not interfere materially with the accessibility of the rear wheel.

As regards general accessibility, this big engine has, of course, to be dropped bodily from the frame for decarbonisation, but this can be done by merely disconnecting the exhaust pipes, etc., and removing the engine plate bolts, leaving the footrests and most other fittings undisturbed. As regards chain adjustment, the gear box is self-aligning, and the four nuts holding it easily get-at-able. Accessibility generally appears to have been studied with care, and in the way of a heavyweight for sidecar use the machine would appear a thoroughly sound proposition.

### Sidecar Connection.

The control is good, the handle-bar clutch being extremely light, and a very simple, but highly efficient, rear wheel brake operating inside a brake drum is used. It will be observed that *straight* rod controls, having the very simplest of connections, are used for the rear brake and gear box, which is an excellent point.

No brazed couplings on the front down tube are provided for sidecar connection, the designer believing that nicety of adjustment necessary for the permanent attachment of a sidecar cannot be achieved when no choice is given as to exact position of the couplings. This, he holds, is particularly the case when machines are sent Overseas. Here some make of



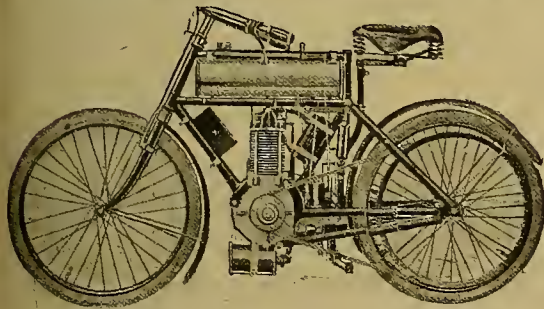
Rear view of machine, showing how the carrier can be swung backwards on depressing the spring lock to facilitate tyre repair.

sidecar never intended to accompany the machine is often attached, and the brazed lugs being *not quite* where they should be, the attachment is never entirely satisfactory.

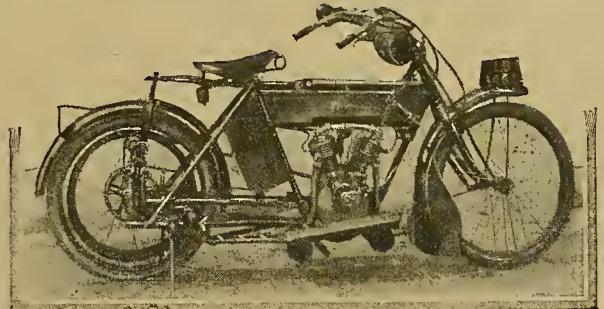
The sidecar is a good piece of work, with ample carrying room and extremely comfortable, while the outfit throughout is of great strength, though not unreasonably heavy, and should prove to be exceedingly durable.

## MORE EARLY SPRING FRAMES.

Among the Pioneers of Spring Frame Practice was the Bat Manufacturing Co.



An early spring frame machine produced by the Bat Manufacturing Co.



One of three motor cycles built in 1906 by H. Monk, having sprung frames.

IN our issue of August 30th, under the heading "An Early Spring Frame," we published a short description and illustration of a spring frame design of many years ago. The frame of the machine was strongly reminiscent of Bat design, and was sent to us as an experimental Bat, the standard model spring frame of which is well known to every motor cyclist.

The Bat system of suspension, by which the rider is insulated from road shock by means of a saddle and footrests sprung in unison on the rigid frame, has stood the test of many years, though, of course, it falls short of the true spring frame in that only the rider derives the benefit of the springing, the engine,

etc., being carried as unsprung weight.

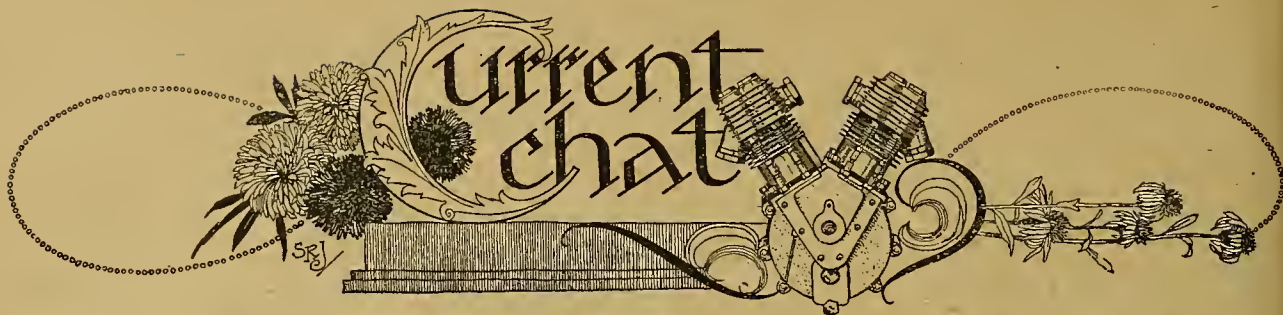
The illustration on the left is of one of the very earliest spring frame Bats, which made its appearance even before an efficient system of front wheel springing was arrived at. It will be noticed that, though the saddle and footrests are sprung, the front forks are rigid, while the position occupied by the rider is hardly an enviable one.

### An Early Rear Sprung Twin.

The spring frame illustrated on the right was made and invented by Mr. H. Monk, of Waltham Abbey, who writes us as follows concerning it: "It was made during the winter of 1906. The first one was just being finished when

I saw the one you illustrated a week or two ago, and noticed the various points of likeness to my own. This consisted of a double frame, having two springs on each side; the saddle pillar was extended so as to slide in the loop on the top of the loose frame to stiffen it. I built only three of these, but they were in every way satisfactory, and I often wish I had time to build myself one now. So far from being subject to side-slip, they were very free from it, due, I believe, to the fact that the wheel did not leave the surface on a bumpy road. I may say that all of them were used with a flexible Montgomery sidecar. I still have one of the old back frames hanging up in my workshop as a curiosity."





## TIMES TO LIGHT LAMPS.

SUMMER TIME.		
Sept. 13th	...	7.50 p.m.
" 15th	...	7.45 "
GREENWICH TIME.		
Sept. 17th	...	6.41 p.m.
" 19th	...	6.36 "

## Noisy Machines Overseas.

We are informed that the Sydney police have been given instructions to take special notice of noisy motor cycles. Riders of machines which are not efficiently silenced are to be prosecuted.

## What it feels like to own a Motor Cycle.

The American author of an article entitled "Why I am a Motor Cyclist" opens the ball by saying, "Owning a motor cycle is like living most everywhere at once."

## C.O.B.E.

Mr. H. Tempest Vane, who was mentioned in *The Motor Cycle* of August 30th as a Commander of the Order of the British Empire, is general manager and joint managing director of Messrs. D. Napier and Son, Ltd., 14, New Burlington Street, London, W.

## Controlling the Petrol Supplies.

It is interesting to note that, while the Food Controller does his best to control the price of food and maintain supplies, the Petrol Controller apparently views the increase of price with absolute indifference. The cause of the increase is said to be due to the heavy cost of ocean transportation consequent upon the great increase in the rates charged under the Government war risks insurance scheme, but, as pointed out by the Editor of *The Light Car*, the increased insurance rates do not justify the rise. On a cargo of one and a half million gallons an increase of 8½d. per gallon is equal to well over £50,000!

## A Novel Punishment.

Recently a motor cyclist named Andrew Myer was summoned at Los Angeles for exceeding the speed limit. We think that most of our readers are aware that offending motor cyclists are not caught in short-distance traps as in England, but are chased by motor cyclist police, who note that the offender is breaking the law by their speedometers. When Myers was ordered to stop he gave the policeman a chase over the most dusty thoroughfares he could find. Instead of imposing a fine the Judge sentenced Myer to gaol, with instructions that he should be put to work cleaning the motor cycles of the city motor cycle police squad.

## American Motor Cycles.

The American War Department recently bought 5,000 machines. They have now decided to standardise military models as regards their control, equipment, and in certain details of construction, and 40,000 of these are, we understand, to be ordered.

## B.S.A. War Fund.

The balance sheet of the B.S.A. Employees' War Fund, which is just to hand, shows the contributions of the workpeople, staff, and officials together to be £23,358, with the bank interest and the interest on investments the amount is £23,807. The grants to dependants and donations to various war funds have reached the sum of £16,527, the balance being invested in the War Loan.

## Hull Magistrates and Signalling.

The Hull magistrates dismissed a summons against Fred Wm. Young, a fish merchant, who was summoned for not obeying the signal of a police officer on point duty whilst riding his motor cycle. The chairman, Major Barton, said there ought to be a universal system of signalling; they did not consider the way the constable had signalled was right. The signal would have deceived him (the magistrate), and he thought he should have taken exactly the same course as the defendant did. He should strongly urge that the police on point duty should be instructed in

## SPECIAL FEATURES.

### ROTARY AND MOTOR CYCLE ENGINES. NEW IMPERIAL MILITARY MODEL. COOLING AND LUBRICATION.

future when they wanted to stop anyone to put one hand up above the head, and not as in the case before them, where the constable had held his arm out level with his shoulder. They thought the motor cyclist would have stopped if he knew the constable's signal, and they did not think defendant was to blame in the course he took. Defendant, who was legally represented, stated that the officer had his right hand out pointing down Anlaby Road, into which he was going to turn. A motor van nearly ran him down, and it was a wonder he was not killed. He was going to make a complaint to the police authorities.

## The Inventor of the Bicycle.

It is worthy of mention, since the pedal cycle is the father of the motor cycle, that on August 1st the Germans celebrated the 100th anniversary of the birth of the "inventor of the bicycle," Baron von Drais. But it happens that the bicycle was not a German invention at all. A velocipede was invented by Blanchard and Magunier in 1779, while the first idea of a bicycle seems to have occurred to another Frenchman, de Sivrac, in 1690.



## CONTRASTS IN LOCOMOTION.

Pillion riding on a blinkered ass has its charms, no doubt, and if the youngsters had their choice of the sidecar or the ass, it is probable that they would plump for the latter every time, especially if equipped with a good ash stick—but every man to his taste. No doubt the Enfield rider prefers his mount.



### An Opportunity Missed.

*Punch* says: "A man named Kite told the Willesden magistrate that he had joined the Royal Flying Corps, and the magistrates refrained from being funny."

### The National Relief Funds.

At the week-end the principal war relief funds stood as follow:

The National Relief Fund (distributed £3,657,622) .. ..	£6,227,539	0	0
British Red Cross Fund .. ..	7,259,880	0	0
Tobacco Fund .. ..	136,636	0	0

### A Conference of the Military and Motor Cycle Manufacturers in U.S.A.

At a conference of manufacturers and Army officers, held at Washington recently, arrangements were made which enabled the Government to have the immediate aid of expert motor cycle mechanics, in order that the full efficiency of the motor cycle may be made available in the war from the very start.

General Baker at the meeting said it was the experience of our English and French Allies, whereas they bought any and all makes of motor cycles at the beginning of the war, they eventually reduced their selection of solo mounts to two or three different makes, and induced the manufacturers to standardise these, to a certain extent, making the running of bicycle parts interchangeable.

In some respects General Baker was right, but the bicycle parts of these machines were not interchangeable.

### Petrol 25s. per Gallon.

All motor cyclists in this country are grumbling at paying 4s. 3d. per gallon for petrol. It may be consoling to some to learn that in Holland the precious fluid is considered cheap at 25s. per gallon, so a correspondent to *The Times* asserts. Even paraffin has risen to the abnormal price of 10s. per gallon in that country.

### Handle-bar Supports.

We notice that the latest racing Indians are provided with handle-bar supports, consisting of straight tubes running from the ends of the handle-bars to the front axle spindle nuts. This is interesting, as we have not seen the like since the early French racing machines, some of 16 and 20 h.p., used on Canning Town track in 1903.

### Men Wanted for the R.F.C.

The R.F.C. are seeking skilled and unskilled men for their various branches. Men over age are eligible, and interesting employment is offered at special rates of pay. Application should be made at the nearest Recruiting Office.

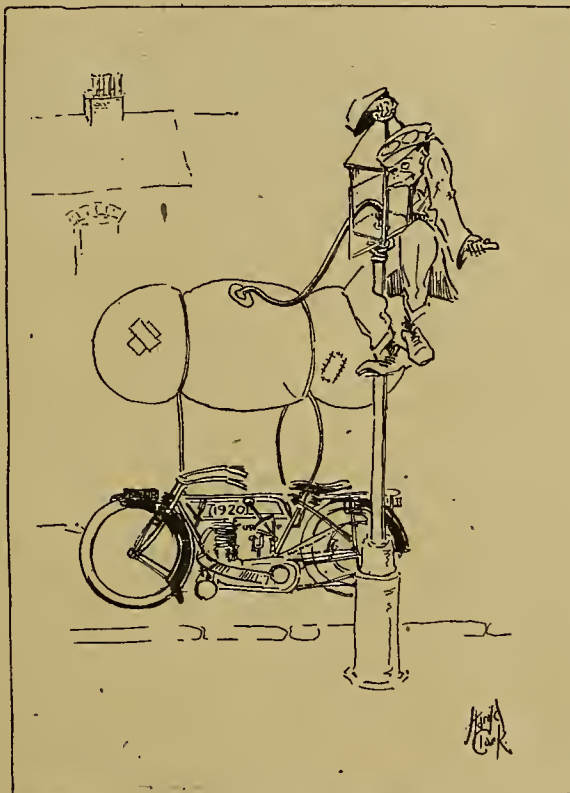
### For How Much Longer?

In Devonshire recently, the absence of motor cycles in busy seaside resorts, such as Torquay and Paignton, was most marked; the number seen in the course of a day could be counted on both hands. The riders were principally military or naval officers.

### Watch your Head.

The majority of amateur riders do not realise the importance of keeping the steering head bearings in adjustment. Hundreds of machines are ridden with slack steering heads, with the consequence that the steering soon becomes imperfect, and an increased tendency towards sideslip results.

The ball races of a steering head are subjected to side strain in addition to direct thrust, and if they are slackly adjusted considerable wear falls on the sides of the cones, causing them to wear oval. In these days of pot-hole roads this adjustment should be given special attention.



### THE 1920 HIGHWAY ROBBER.

When coal gas supersedes the "juice."

### Overheard in the Garage.

Proprietor: "Jones, petrol is up again to-day."

Jones (the shopman): "Yes, sir. What may the price be now?"

Proprietor: "Well, you had better call it 5s., as that will save altering it again next week!"

### Lighter Four-wheelers.

Our contemporary *The Light Car* this week devotes an article by a well-known engineer and designer to the subject of intelligent weight reduction in light car construction. The "Lighter Light Car" campaign has been running for some months by our sister journal, and doubtless it will tend towards the production of a desirable intermediary between the light car and the heavy sidecar outfit of to-day.

### Another "Hot Stuff" Machine.

For advertising for sale a 33 h.p. Centaur motor cycle, the *Surrey Comet* takes the biscuit.

### An Up-to-date Grocer.

A grocer of Moira, Leicestershire, was recently fined £1 ls. at Coalville for not having proper lights on his motor cycle. He is reported to have offered a bribe of 2½ lb. of sugar to the policeman who stopped him.

### Lucky Farmers.

A contractor complains that farmers in his district have petrol to spare, while he, on whom the farmers are depending for the maintenance and repair of their property, is allowed only a miserable two gallons per month!

We are not keen on airing the views of people who emphasise the injustice of the world by pointing to others more favourably placed; and if the farmers are able to get petrol, then—lucky farmers! We doubt whether our contractor friend would obtain any more if the farmers' supply were cut down—as he suggests it should be—and, anyway, the matter rests in the hands of the Board of Trade.

### Carroll's Average was 53.6 Miles per Hour.

In setting his world's records for 500 and 1,000 miles, for twelve and twenty-four hours, with a sidecar at the Cincinnati, O., Speedway, on August 14th-15th, "Teddy" Carroll averaged 53.6 miles per hour for the entire twenty-four hours of riding, and not 48.28 as originally stated. Carroll covered 1,275½ miles during the entire period of twenty-four hours. He drove a stock Powerplus Indian sidecar outfit.

### American Motor Cycle Recruits.

Glancing the other day through our American contemporary, *Motor Cycling and Bicycling*, we noticed that two pages were devoted to recruiting. This is reminiscent of *The Motor Cycle* in 1915 and 1916, when it was successful in obtaining so many thousands of recruits for the technical branches

of the Army. This department, entitled "Uncle Sam's Fighting Men," will, so our contemporary states, form a regular feature of the paper.

### Chain Cases Wanted.

Why do the makers of chain-cum-belt machines pay so little attention to the adequate enclosing of the front chain? An oiltight front chain cover is more vitally necessary with this type of transmission than with an open rear chain drive, for oil is invariably thrown from the front chain on to the belt, causing excessive slip and wear of the latter. Usually the front chain is fed with lubricant from the crank case release, which is somewhat impartial in its manner of distribution, and it is for the protection of the belt that the totally enclosed front chain is so highly desirable.



# COOLING AND LUBRICATION.

Over-cooling and its Results, together with Notes on Piston Design and Lubrication.



**T**HERE is no doubt whatever that the term "radiation" is wrongly applied in the case of a motor cycle engine. The cylinders are kept cool not by radiation, but by impingement of the air on the cylinder fins. The theory, if such it may be termed, has already been aired in *The Motor Cycle*, and any reader who cares to provide himself with proof can do so by means of a very simple experiment. Place the machine, with the engine at its normal running temperature, in some position where no draught can play upon the cylinders, and it will be found that, even at the end of an hour or more, so slow has been the loss by radiation that the fins are still considerably above atmospheric temperature, whereas, had the machine been left out in the street where some little current of air could impinge upon the fins, it would be stone cold, or almost so, even at the end of a few minutes.

Vast strides are being made in the matter of radiation, but it is to be observed that these experiments are mostly in connection with *stationary* air-cooled engines used for marine work and such purposes. In the case of a stationary engine cooling can truly be said to be by radiation only, and what I am trying to get at is this, that an engine that will run at a desirable temperature on full load in a closed atmosphere for long periods at a stretch, as can the latest A.B.C., would probably run too cool when subjected to a strong blast of air; in other words, if radiation alone will keep it at its best working temperature, radiation combined with violent impingement of the air will probably keep it at a temperature below that at which it works best.

## Loss by Over-cooling.

Car owners know the curse of the engine having a super-efficient cooling system—the engine that does not settle down to its work until it has done ten miles or so—and all manner of devices, such as a clutch for the fan, are in use to cut short the warming-up period. Motor cyclists also are troubled with over-cooling. We all know that an engine runs more economically during the second twenty miles of a ride than it does during the first twenty miles; we all know how extravagant in oil and petrol a machine proves when it is used only for short runs, during which it does not have time to warm up properly. I have myself possessed single-cylinder machines which I used to ride on bottom gear up a steep mountain byroad for fully a mile, joining the main road further on, when setting out on a long ride. That was the only way to warm

up the engine in anything like reasonable time: while I have known other riders who made a practice, in the days of plenty, of allowing the engine to tick over on the stand for ten minutes or more while they donned their overalls and so forth.

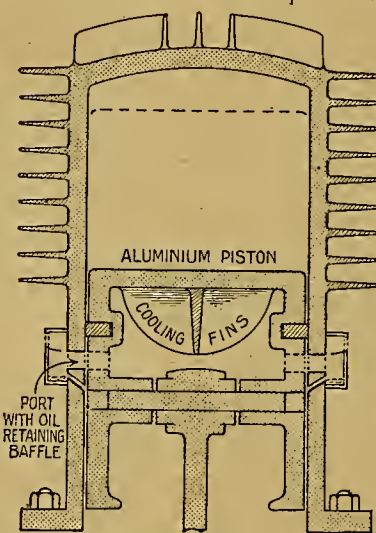
Personally, I have never been troubled with over-heating since 1913 or thereabouts, and I think that if cylinders were scientifically designed to avoid distortion, the present-day engine in proper tune would run normally at its best temperature. If we are to have an engine which simply cannot be made to over-heat, even though one overload it by attaching a sidecar and driving badly, then that engine will, when judiciously treated and well handled, probably run at a temperature below its best working temperature, and so will not be efficient. What I mean is that by adopting the steel cylinder we shall have achieved all that can advantageously be achieved in the way of external cooling.

## Smartness and the Power Unit.

It is well to bear in mind that one can have too much of a good thing. For weeks past we have been hammering with fitful energy the matter of improved cooling. We have advocated multitudinous wafer-like steel fins, aluminium pistons, and an engine that is cooled internally by means of a forced draught, but if all these excellent features were carried into practice in their best form the engine evolved would probably put up a very poor show except on the racing track. The internal combustion engine is such a unique compromise—hence its interest—that it is very easy to overdo one's pet theories when carrying them into practice.

Naturally, one advocates the steel cylinder and the aluminium piston, not entirely from a cooling point of view when applied to touring engines, but largely from the point of view of weight. Let us have a slightly more extensive cooling surface, but let the wafer-like fins be crowded round the combustion head and disposed in such a way as to catch the current of air; then let us have the base of the cylinder nicely machined and plated, preferably with copper.

The motor cycle engine of the future, besides being highly efficient, will present a neat and attractive appearance, for every reader is drawn to an engine that looks smart and businesslike on the show stand. How many riders have felt themselves drawn towards the Scott and the Brough on account of the neat appearance of their power units? and I think this matter of external engine finish is one that has been grossly neglected, and that it might advance



Section of piston with cooling fins to relieve the hot spot by means of an air current passing through oiltight ports or breathers in the cylinder walls.



### Cooling and Lubrication.—

tageously occupy a little more thought on the part of designers. Above all things, let us bid farewell to cylinders which rust; let us have plated cylinders in their place, and if a high lustre could be imparted to them it would gladden the heart of many a proud rider.

### A Cool Running Engine which Regularly Overheats.

But to return to the matter of cooling. It is no longer a question as to whether we can efficiently cool the engine externally; the problem lies in distributing the heat evenly, in avoiding hot spots, and in efficiently cooling the engine oil. It would be very easy to arrive at an engine the external cooling of which was so excellent that it could not be made to overheat, yet in other respects the cooling of that engine might be most inefficient, in that if the engine bearings were to last, the unit would demand an excessive quantity of oil. Its external cooling might be superlative; its internal cooling bad.

### Oil Cooling.

It is rather surprising that many leading engineers still cling affectionately to the notion of cooling the engine internally by means of the lubricating oil. We have had it in car practice for years past, and to-day it is cropping up in aero engine practice. Every rider knows that the hottest spot in the whole engine is on the piston head. We have clever little lubricating systems whereby a squirt of oil is shot into the piston, spraying over the hot spot at every stroke. Of course, oil galore is wasted in this way, but that does not matter much in the case of luxurious car and aero engines. Half the oil is flashed into vapour and shot out of the breather, but the greatest shortcoming of the system is that each little squirt of oil must leave behind it a certain deposit which is duly converted into carbon inside the piston, and so in due course the inside of the piston is covered with an excellent non-conducting coat of carbon. For all the good it then does, the squirt of oil might not be delivered at all.

Two features that must be aimed at in the motor cycle engine are low oil consumption and a minimum of carbon deposit. Internal cooling by oil is extravagant and shortens the period between intervals of taking down the engine, besides destroying the lubricating properties of the oil by overheating it. Therefore the idea of oil cooling can be ruled off the boards. What we have to aim at in motor cycle engines is to keep the oil at as low a temperature as possible, so that its maximum lubricating qualities will be retained, and a minimum of wastage will accrue by evaporation, etc.

### Aluminium Pistons.

The aluminium piston of to-day does not make any attempt at absorbing the heat from the hot spot and getting rid of it immediately. This is what should be aimed at. The sole object of the aluminium piston is to conduct the heat from the hot spot and distribute it more or less evenly over the entire area of the piston, getting rid of it in the best way possible by conductivity

through the doubtful medium of the piston rings. This is good as far as it goes. Instead of the piston being red hot at the top and cool around the bottom of the skirt it is more or less of an even temperature all over, so that it does not act as a flash plate for the lubricant; but it relies upon the piston rings for conductivity, and in this respect it falls short of permanency. The piston ring of the future will be extremely narrow—little more than an oil scraper—and so the area of contact will be small. Moreover, if the engine is to be economical in oil and is to require a minimum of decarbonising then the piston rings should be kept as cool as possible, i.e., the heat from the hot spot should be carried away and dissipated ere it reaches the rings.

### The Hot Spot of the Piston.

It is not a difficult matter to evolve an arrangement whereby the heat from the hot spot of the piston is blown into the air and got rid of immediately instead of being carried to the rings. In *The Motor Cycle* of late several ideas have been illustrated whereby the displacement of air in the crank case is utilised to play forcibly on the hot spot (as suggested in "Internal Cooling," issue of April 19th last, page 345), and on this page is illustrated an exceedingly simple method whereby a single port, operated automatically by the piston, brings a cold blast of air in contact with the piston radiating fins at every stroke of the engine.



A baffle would be fitted to prevent oil splashing excessively inside the piston, the gudgeon pin being oiled through the hollow connecting rod.

There are, however, so many ways of cooling the centre of the piston by means of air draught that there is not much object in suggesting more, but it may be added that the only ideas worth carrying into practice are those which are free from gadgets, and which adapt themselves readily to the engine without knocking up the cost, incurring weaknesses, or demanding awkward and unsightly evidence.

### Summary.

The pith of this article is that having apparently mastered the problem of external cooling we need to turn to the problem of getting the last ounce out of the oil used by maintaining it at its maximum lubricating temperature. If this can be done the life of the engine will be indefinite. The best way of keeping the oil at a low temperature is to eliminate that offending hot spot in the piston head, which hitherto has been a veritable thorn in the flesh, and to get rid of the excessive heat by some mechanical means. Taking it that we succeed in this, then we can look forward to an engine that will accumulate a minimum of carbon deposit, and which will possess unlimited wearing qualities, because the short life of engines of to-day is largely due to the fact that their wearing parts are destroyed through the lubricating oil losing its virtues by becoming heated—that is, that half the time the engine is running the oil is at too high a temperature to do its work thoroughly. Cool cylinders alone will not effect this end unless we succeed also in eliminating the hot spot in the centre of the piston or in keeping the oil away from it. CHINOOK.



## MILITARY NOTES.

## MOTOR CYCLIST HONoured—1911 T.T. RECALLED.

MOTOR CYCLIST HONoured  
BY THE KING OF ITALY.

CPL. J. CALDWELL, R.E., has had the bronze Military Medal for valour conferred on him by the King of Italy.

A BRAVE MOTOR CYCLIST  
MARRIED.

A FORTNIGHT ago Capt. Kingston Graham Hodgson, R.A.M.C., was married to Miss Winifred Jenkins at Chertsey. Capt. Hodgson, a 'Varsity man, volunteered for service as a despatch rider at the beginning of the war, and joined the immortal Fourth Division in the retreat from Mons and Le Cateau, and served during the Battle of the Marne. In the course of his service as a motor cyclist he was blown from his machine and wounded, after which he returned to England, qualified as a doctor, and again returned to France.

## THE T.T. OF 1911 RECALLED.

PTE. T. W. VANN, of the A.S.C., sends us the following letter: "I am enclosing a photograph of some of the boys attached to various companies of the M.T. (A.S.C.), Sydenham Centre, which, I believe, will interest a number of readers.

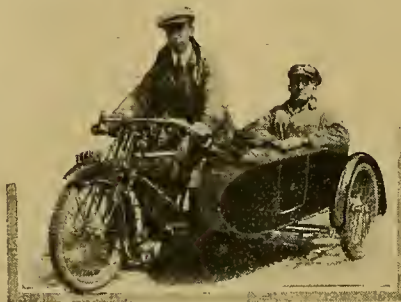
"On looking through the photograph you will note a well-known private owner competition rider (Cpl. F. Johnson, now Sgt.), who rode in both events at the Isle of Man in 1911, and being first private owner home in the Junior on a 2½ h.p. Humber. He also rode a twin Matchless in the Senior, to say nothing of numerous other events both at Brooklands and elsewhere. He is one of the best, and very much liked by all.

"The names of the riders, reading from the left, are: Ptes. T. W. Vann, F. Bolton, J. P. Wilson, — Sharpe, P. Hilton, R. Bott, J. Butcher, L. Walsh, Sgt. F. P. Johnson, Lt. Richards, Ptes. F. J. Chenery, H. G. Hitchcox, E. M. Reynolds, and O. Joyce. Best wishes for the 'Blue 'Un.'"

A ONE-LEGGED MOTOR  
CYCLIST.

WE have received from Bryan Jefferys (formerly of the Border Regt.) a letter which shows that, in spite of the loss of a leg, he still retains his enthusiasm for the motor cycle:

"The enclosed photograph may be of interest in view of the fact that I lost my right leg while serving with the Border Regiment in Flanders. The machine is a three-speed T.T. Norton, and I have nothing but praise for it. A



B. Jefferys, formerly of the Border regiment, with his brother in the sidecar. Jefferys unfortunately lost a leg in the in the early part of the war, but he is still a keen motor cyclist.

distance of over 3,000 miles has been covered without the slightest trouble of any sort, with the exception of one puncture only. The tyres—heavy studded Dunlops—are standing wonderfully well, and although the back tyre studs are getting rather worn after continuous sidecar work, the tyre itself has hundreds of miles to run yet. I could not have a handier or more convenient machine, and it has an extraordinary turn of speed, too, which is very much to my liking, as before the war I was used to riding big solo twins. My passenger is a younger brother, who is now driving one of the Red Cross ambulance cars attached to the French Armies."

## AN ACTOR MOTOR CYCLIST.

CAPTAIN GEOFFREY GWYTHYR, who is now playing "Cosmo" in "Carminetta," after being blown up and buried by a shell in France, was thrown from his motor bicycle while doing staff work in England.

## E.O. COMMISSIONS.

WE understand that in future commissions for the post of equipment officers in the R.F.C. will not be granted until the candidate has completed a course of training as a cadet.

FORMER MEMBER OF THE  
STAFF KILLED.

WE greatly regret to learn of the death during a flying accident of Lt. L. E. Stuart Vaile, which occurred in Norfolk on August 29th. He was a member of the staff of this journal in 1913-14. He was the son of the Rev. A. Vaile, of West House, Seaford. He enlisted in August, 1914, as a despatch rider, and had two and a half years' service. When killed he was acting as instructor, R.F.C.

## AMONG THE EXPERTS.

PRIVATE HANDEL DAVIES, M.T., A.S.C., who has been on active service since 1914, previous to which he was a competition rider, says: "I have met many of the expert men I used to know before the war, viz., Capt. Newsome, Rowlandson, H. Newman, Duggy Brown, and H. R. Davies. I understand the latter is now a prisoner of war. I have also met Capt. Lindsay, R.A.M.C."

U.S. AIR BOARD'S THREAT TO  
SEIZE PRIVATE WORKS.

THE United States Aircraft Board has threatened to seize all the well-known aeroplane manufacturing plants and the works of the makers of aeroplane parts, following an investigation which showed that the Government was being charged excessive rates.



Motor cyclists attached to the various companies of the M.T., A.S.C. Reading from left: Ptes. T. W. Vann, F. Bolton, J. P. Wilson, — Sharpe, P. Hilton, R. Bott, J. Butcher, L. Walsh, Sgt. F. P. Johnson, Lt. Richards, Ptes. F. J. Chenery, H. G. Hitchcox, E. M. Reynolds, O. Joyce.





## LETTERS to the EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

### POLICE INTERFERENCE.

Sir,—In answer to Mr. Alfred E. Skinner regarding being stopped by the St. Helens' police, I may say that I have heard nothing further. Certainly, I have not had occasion to go through St. Helens since, but have ridden round about without being stopped. With regard to his contemplated tour in North Wales, I should think the risk would be infinitesimal, and I should not hesitate to go.

H. ALDRED.

### BROOKLANDS MODELS.

Sir,—With regard to your note *re* Norton Brooklands Specials in your issue of September 6th, as I dismantled, re-assembled, and tuned all these engines, without exception, at Brooklands, I have rather full records regarding them, and shall be very pleased to supply any member of the public, who will send a stamped addressed envelope and quote the number of the particular engine he is interested in, with any details required, including the actual speed done on the official test.

D. R. O'DONOVAN.

### ROAD SIGNS.

Sir,—Being an interested reader of your journal, and associated journal *The Autocar*, I should be pleased if you could find space for the following criticism on the extremely bad method of road signs employed in this country. The familiar red triangle has had its day, and motorists can hardly be expected to observe a sign which one meets every couple of hundred yards. Again, "Dangerous Cross-roads"—surely sufficient warning—is ignored nine cases out of ten, because they are either posted on the main road, where it is the duty of the rider on byroads to take special care, or where there are no cross-roads, as three places I could mention have but a lane running in. Can anyone ask main road users to look at every gap in the hedge when two hundred miles has to be completed in a day? May I just draw the attention of motor cyclists to the danger of Bagden Hill, near Burford Bridge, where, fortunately, I escaped with my life and my friend's by doing the right thing at the right moment? At the top there are two signs—the familiar red triangle and "Dangerous bend." Why not put "Six dangerous bends—gradient 1 in 3½," which might have saved a young fellow killed there recently?

Earlswood.

NEARLY DONE IN.

### HANDLE-BARS.

Sir,—May I venture an opinion on the subject of handle-bars? I have possessed, in succession, a 1912 Scott, with high narrow V shaped bars and long footboards sprung at both ends; a 1916 3 h.p. Enfield, with semi-T.T. bars and footboards sprung one end; and a 1915 T.T. Norton, with full T.T. bars and footrests in a line with the saddle. I have several times done the same seventy-five miles run on each machine non-stop. In each case I have run to a schedule giving 26 m.p.h., so I have a good basis for comparison. On the Scott I got backache, and found the saddle uncomfortable. This discomfort disappeared on the Enfield, but I found after about sixty miles my legs always ached intolerably. On the Norton I am free of all aches, except on a long down grade, e.g., Birdlip, when the weight on the arms is distinctly noticeable.

The Norton has the same saddle as the Scott, so that I conclude that the saddle "hardness" is not the fault of the saddle, but of the upright position. The leg ache on the Enfield I put down to the combination of semi-T.T. bars and footboards, for when the body leans forward and the foot is kept flat, the leg muscles below the knee are con-

tinually in tension. On the Norton the legs are apparently more cramped, but as the footrests allow the toes, so to speak, to hang down there is no strain on the leg muscles.

My conclusion then is that while footboards are comfortable enough with touring bars, rests are far preferable with T.T. or semi-T.T. bars. I think this possibly explains the shape of bars used by Baker and Parkhurst, as their machines both have footboards, though a reference to the photographs (August 16th and September 6th issues) show that "Novice" was not quite accurate in calling them touring bars, as in the one case the ends of the bars are level with the saddle, and in the other considerably below it. For short, dry runs touring bars are delightful, but for long, non-stop runs, or in grease, that full T.T. bars are infinitely more comfortable is my experience.

J. M. PHILPOTT.

### A PUZZLING TROUBLE.

Sir,—I wish to relate a trouble I had lately with my two-speed motor cycle, thinking it might be of some help to fellow motor cyclists. The other day I was out for a jaunt, my machine going very well: it got up a fair gradient beautifully on high speed, but further on I had to throttle down on a slope on account of the bad state of the surface. A little further on, as the road became better, I opened the throttle, but the machine did not pick up. Finally I had to run on low gear, and had some difficulty in going up a slight hill, when the engine stopped altogether, and I set to work to investigate.

Finding that the front cylinder was not so hot as the back one, I thought something was wrong with the ignition, so setting the engine in motion I tried the front sparking plug, but I found that it was sparking beautifully, and the back one was all right, so it did not seem that the ignition was at fault. I looked at the carburettor for obstructions, but everything seemed in good order; then I tried to restart the machine, which ran beautifully as far as my friend's house. When I left him the same trouble began again for a while, but at last the engine fired on both cylinders. I went to see another friend a few miles further on without any trouble, got up another steep hill fairly well on high, and rode home at good speed. When in the town I had to throttle down again on account of the crowded traffic, but was only able to reach home on one cylinder, as the front one would not fire.

The following day I put the machine on the stand and tried to locate the trouble. I tried the magneto, the high-tension wire, the sparking plug (the spark was very good), then both valves and springs, then the carburettor, pipes, and connections, but all were in good order. For the first time I felt very much puzzled. As the magneto was giving a good spark at both plugs, evidently the trouble was not there, but, everything having been looked at except the carbon brushes, I decided to unscrew the front one, and on looking at it and examining it carefully I found that the brush was sticking slightly in the holder, and when pushed as far as it would go it would stay there. No doubt this was my trouble, and on dismantling the brush and its spring I found that some of the coils were working over the others, so that it was not doing its work. When running the engine fast the spark was strong enough to jump the gap, but when running slowly it was not jumping at all, and this was the reason why my machine would only fire properly at high speed. So ended a trouble which seemed very puzzling. The machine now goes as well as ever.

GEO. G. BELLNOT.

Tours, France.



## WHICH TYPE OF ENGINE?

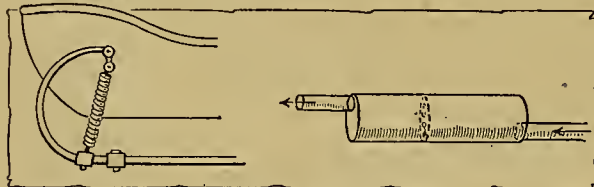
Sir,—I see under the above heading that "Qui Vive" makes a few remarks on a new type of engine. By a new type is meant something new to the public. No doubt the few remarks made on this subject will whet the appetite of a number of your readers for more. In the first place, experimenters on such an engine have been going on here in England for years, but naturally obstacles have turned up thick and fast. Compression gave a lot of trouble; also something was required to act as a carburetter; also the great quantity of heat developed was too useful to throw away by air or water-cooling methods. I have reason to believe that the public will have to wait, perhaps, a year or two before this engine is brought to a commercial success, therefore to give more than a bare outline is impossible. The engine to which I refer was originally intended for aeroplane work, the latest model is capable of four power strokes per revolution—the earlier models had two; also it is valveless. Perhaps it will be fitted up with spark plugs; if so the number will be four. It is intended to run in either direction. Water is as necessary for satisfactory running as petrol, and is injected at a certain period, so I should say that the hotter it gets, in reason, the better, as it will then use more water and less petrol. The cylinder is of steel, with cast iron liners, and it has positive scavenging. British manufacturers will get going, but first require something worth the trouble and capital. The reason the public have not heard about this before is because it is only in its experimental stages, and development takes time. We are, I think, much nearer the internal combustion turbine now than four months ago.

V. MITCHELL.

## THE ADVANTAGES OF A WATER DRIP.

Sir,—Perhaps an account of some additions I made to my motor cycle might be of interest to readers.

I am a general practitioner, and use my machine daily in all weathers.



Extra springing and silencer.

It is a 1917  $\frac{3}{4}$  h.p. Ariel with a not-too-heavy sidecar. I have nothing but praise for the outfit (usual disclaimer, please!). Even in the coldest weather of this year it rarely failed to start first kick after standing all night in the garage (unheated).

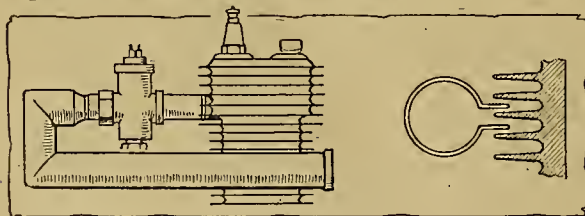
On straight runs, with passenger, I get 65 to 75 m.p.g. I completed 100 miles in 5h. 5m.

The additions were as follow:

(1.) Terry's spring links (6 h.p. pattern), which are a wonderful comfort, combined with the spring seat-pillar.

(2.) Tension springs across the chord of the sidecar C springs. These make the riding of the sidecar much more comfortable.

(3.) An extra silencer was made for me by a local tinsmith at a cost of 5s. 6d. It fits over the tail pipe, is 12in. long x 3in. diameter, with a baffle plate on the inner sleeve



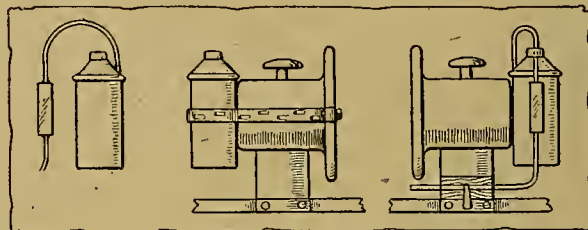
Hot air intake.

over the tail pipe, and a final exit some 4in. long. This, with light springs holding the tappets up to the valves, makes very quiet running for a single.

(4.) A hot air intake to the Amac carburetter (I use a 30 jet with war spirit). It is of brass tube, fitting over the

air intake. The cylinder end of this tube is cut with an H-shaped slot, and the flanges turned out and fitting between the fins on the cylinder between the valves.

(5.) A water drip and extra air fitment. I made a small "tank" out of a Shinio tin, and a sight drip feed out of a glass and vulcanite syringe and a hypodermic needle. This is attached to the mechanical horn by two Meccano strips bolted to the fore plate of the horn. From the drip feed a tube goes to a two-way tap from an old surgical aspirator, which is screwed into a block of wood clamped under the horn. This tap is then carried down to a piece of tubing screwed into a hole drilled in the carburetter intake, between the throttle barrel and the cylinder stub pipe, by means of flexible gas tubing. The tap gives extra air by the



The arrangement of the water drip.

forward end of the cross tube, normal carburetter action when shut off, and a water drip by the rear end of the cross tube.

The hot air intake and the extra air have added some 10 to 15 m.p.g. I have run on paraffin with a little ether added in an emergency.

The water drip reduces knocking on hills in a marvellous way. The engine will pull up long gradients that meant a lower gear formerly. When the drip is "on" the exhaust becomes much softer in tone, and the drive less inclined to be snatchy. It does not increase power, and necessitates reduced air intake when in use. I believe it keeps the engine decidedly cooler. I average somewhere about 100 miles per week, and have now had the machine for seven months.

Let me add that, during a long period of trench life (as a battalion M.O.) last year, your paper was a brilliant spot in a mud-coloured existence, and much that I gleaned therefrom has been of great service to me in my present somewhat disabled condition.

M.R.C.S.

Bolton.

## STARTING WITHOUT RAISING EXHAUST VALVE.

Sir,—One of the most awkward mishaps to a motor cyclist on the road is to break the control wire of his exhaust lifter. If on the move, he cannot stop unless his throttle will close right over, and many will not. If standing, he cannot start. We all know the old device of the penny with a hole in it and a string. I have never tried it, and fancy it would be of doubtful utility. But I have discovered that it is quite easy to start an engine without ever touching the exhaust lifter, and think the tip may be worth communicating. It has relieved me of the fear I have always had of being hung up on the road by the exhaust lifter cable breaking.

Work the kick starter till you are up against the compression. Now open the compression tap, and press on kick starter pedal till air ceases to issue from tap. Release pedal. The piston is now at the top of the compression stroke. Inject a few drops of petrol, and close compression tap. Now give kick starter pedal a vigorous shove, and engine will fire at once. Controls are, of course, in the usual position for starting—air closed, throttle partly open, and spark slightly advanced.

The idea occurred to me, on reading E. Hardman's letter in *The Motor Cycle* of August 30th, page 216, that by using the compression tap to release compression, instead of the exhaust valve, one would be independent of the latter, and its being temporarily out of action would not matter. By using the clutch and throttle when changing gear, one would then be entirely independent of the exhaust valve, and the breakage of its control would not matter in the least. The plan is completely successful. WM. F. A. ELLISON.

[This is often the easiest way to start a single-cylinder machine.—Ed.]



### INVERTED CONTROL LEVERS.

Sir,—There is something to be said in favour of these from the "Is it safe?" point of view. In case of a spill they do not damage one's person, while the other kind are capable of inflicting an awful gash in the leg or knee. I have actually seen this happen.  
Coventry.

INVER.

### BRAKES.

Sir,—I have just read with interest the discussion on "Brakes" in your issue of August 30th. The subject interests me, as I was recently fined 10s. for driving without a front brake. I had only removed the blocks a day or two before, as it was impossible to adjust the brake to avoid rubbing. It may interest Devonshire readers to know that there is a policeman specially placed in Exeter to look at the brakes of passing motor cyclists.  
T.E.H.  
Havant.

Sir,—*Apropos* "The Critics," my Harley-Davidson combination has only one brake fitted. I find the engine acts well enough down any hill when running on low gear with exhaust valves lifted; but were the chains to break, I am afraid the band brake would not be sufficient on a steep hill. Can any reader suggest a suitable brake for the front wheel, which, by the way, is a disc wheel? This does not allow much room for the brake blocks, and I think a brake on the front wheel advisable in the case of a combination.  
T. BARKER.

### DECARBONISING.

Sir,—As the originator of the oxygen process for decarbonising cylinders, I venture to point out that the popular misunderstanding in regard to this method finds its way into print in your issue of August 30th, page 215. The "oxygen flame" is there spoken of, whereas it should always be remembered that oxygen is only a *supporter of combustion*. It is the carbon that burns, entering into combination with the oxygen and forming carbon dioxide (CO<sub>2</sub>) and a variable amount, according to conditions, of the very dangerous gas carbon monoxide; most of it, however, being consumed before issuing from the cylinder into the atmosphere.  
GUY S. A. B. S. WATKINS.  
Lieut. R.N.V.R.

### AVERAGE SPEED.

Sir,—I notice in your paper several "tall" claims under this head. Perhaps the following experience of mine, last year about this time, would interest some of your readers. I set out to ride to Paignton *via* Gloucester and Taunton, riding an 8 h.p. 1914 Chater-Lea, with a friend (about eleven stone) in sidecar, in addition to about 1 cwt. of luggage, tools, spares, and a spare tin of petrol. For the first thirty to forty miles as far as Dowlais top, it is all heavy climbing. I spent two and a half hours on the road for food and refills of substitute (I used nothing else), and arrived at Exeter (where my driving chain broke, and where I had to leave the machine over night) at 7 p.m., having done the whole 210 miles or thereabouts in nine hours actual driving, or an average of 23½ m.p.h. I drove the whole distance, but felt the result that night in the wrists and at the back of the neck, otherwise I was quite fit.  
R.H.O.

### THE PETROL POSITION.

Sir,—Your article on the above is good reading. When rumour states there is plenty of petrol, for once it does not lie. Last Tuesday a friend of mine filled up his car at Barnsley, and they told him at the depot they had 16,000 gallons in stock *waiting for customers*. It would be interesting to know why miners are able to purchase new combinations and get permits for petrol, and yet others connected with collieries in official positions and who have owned outfits for years cannot get a renewal. I should be happy and proud to take off my hat to the man who can understand the working of the Petrol Control Committee. It would, I think, have been much better to issue permits on payment of the tax, and leave it to the motorist to get the "juice." If he could not he would lose his 6d. per gallon; if he could it would show there is no shortage. And if there is a shortage why do they allow it to come into

the depots at all; why not keep it where it is wanted? This method might be more of a businesslike way, and we cannot lay the "crime" of business methods against the persons concerned.

The more one learns of the true state of affairs the more disgusted with the meddling one becomes.  
GEO. WESTON.

### BUILT AT THE FRONT.

Sir,—Thinking you may be interested to know what can be done with "bully beef" and biscuit tins, I enclose a photograph of our "Pug," which we built while on active service.

It is composed of the following parts:

A Levis engine, which we found. Frame which was bought as a bargain from a Frenchman for 25 francs. Handle-bars which we took off a push-bicycle and rebent

Motor cycle built on active service from parts collected here and there. (See accompanying letter from Cpls. Cox and Morgan.)



with a pair of wood grip extensions. Tank made out of sheet steel. Mudguards built up from biscuit tins. The fittings, such as foot brake, footrests, engine plates, and magneto control, etc. (with the exception of nuts and bolts and wire control, which we begged off the Signals) we made from raw material. The bicycle has done 3,000 miles, is still going strong, and will climb any average hill. I may say we have since fitted spring forks and two-speed gear, which we took off a captured Hun N.S.U.

SEC.-CPL. J. R. COX.  
L.-CPL. W. G. MORGAN.

### ALUMINIUM AND AIR COOLING.

Sir,—I have been much interested in the discussion, the use of aluminium as a radiating agent in motor cycles, which has been taking place in your paper lately. One point has struck me: all seem to have used *polished* aluminium fins or jackets. It is well-known that a dead-black surface radiates far better than polished metal, so I wonder that no one has (apparently) tried dead-black aluminium, which should give even better results than have been accomplished hitherto. Aluminium is easily given a dead-black surface, which, in my opinion, would not detract from the appearance of a cylinder.

The white of a fresh egg is applied by means of a soft rag or rubber sponge (a brush produces bubbles, which appear as light spots later). When a thin, even coating has been applied, the part is baked for some time in a hot oven. (It may be sufficient to paint a cylinder with the egg and run the engine for a time, but I would not like to venture a positive opinion on this point.) A fine dead-black surface should result.

On my present work I cannot try any experiments, but I should be much interested to read of further results in this direction. I see no reason for the trouble and weight of water-cooling.  
L. J. VOSS.







**A Car Licence for Motor Cycle.**

At the beginning of the year 1917 I had an 8 h.p. Humber motor car, for which I took out a three-guinea licence. Now I have sold the car and bought a motor cycle. Shall I have to take out a Revenue licence for this machine, or does the three-guinea licence cover it?—A.W.

As you have sold your car, the three-guinea licence in your possession will see you through for the year as duty on the motor cycle.

**Irregular Firing.**

(1.) The back cylinder of my 1913 twin Rex is constantly oiled up, and the excess oil gets out of the cylinder bases between the washers, but the front one is dry and does not show any signs of overoiling. Would you give me a hint as to the cause of this? My machine has an oil pipe from the crank case to the induction pipe. (2.) On starting, both cylinders fire, but when I engage the clutch one will stop firing, with the result that if I have a passenger on board the engine stops. If I run for a while on the one cylinder the other will start firing after about 300 yards. If I lift the exhaust lever very carefully I can often get them both firing regularly, when I ease the compression a little. I have the same difficulty sometimes after about ten miles running, and if I get off, pump in about three pumpfuls of oil, and start, I run all right again, but the same thing will occur after another ten or fifteen miles. My machine has drip feed lubrication, as well as the hand pump. (3.) Should I pump oil in as well as use the drip feed, and, if so, how often? I do not mix my lubricating oil with petrol on account of the pipe from the crank case. (4.) If I put extra washers under the cylinder caps would that assist me? I think I must have too high compression. I am running on 75% paraffin, with a 28 jet in a B. and B. carburetter. This is set between the cylinders. I have a fine copper gauze in the induction pipe to assist in breaking up the fuel. I have tried with a file to find which cylinder is the culprit, but sometimes it is the back and sometimes the front.—H.C.

(1.) This seems to show that you are using too much oil, which you have to do to get a sufficient supply for the front cylinder. The remedy would be to connect your drip feed to the front cylinder and allow the back cylinder to be oiled by splash. You could then use your hand pump when the engine seemed to be at all short of lubricant. (2.) The trouble in question may be due to an air leak at the induction pipe union to the cylinder which misfires. Look to your contact breaker, see that the points separate properly, and try a new plug in the back cylinder. Also note that the plug gap is correct. (3.) Use the pump only when you think the engine is short of oil, or when you desire to give extra oil, such as when on a hill. (4.) As you are using a good deal of paraffin perhaps it might be desirable to reduce the compression in the manner

suggested in your letter. We are not sure that a fine gauze in the induction pipe would be of any great advantage. You should also look to the strength of your exhaust springs, and overhaul the engine generally.

**Knowledge of the Use of Tools.**

Under the heading "Touring Outfit," every edition of "Motor Cycles and How to Manage Them" includes a small hand vice. I have been a motor cyclist for seven years and have never been able to think of a single use to which this tool could be put; what is it for? I have questioned my friends, also motor cyclists of long standing, and they say they only carry one because, according to the handbook, it seems to be the proper thing to do.—E.W.H.

One useful purpose to which a hand vice might be put would be in the case of a nut or washer, or any small part which required to be filed. This work could not possibly be done without a hand vice, as something is required to hold so small an article. In the case of some part requiring to be compressed, which offered greater resistance than could be overcome with a pair of pliers, there, again, a hand vice would be very useful. We have carried one for many years, and, although we have not had to use it very often, when it has been wanted it has been wanted very badly.

**Knocking.**

I have a 1913 three-speed clutch model Triumph, and have had the engine down, fitted a new piston and rings, and new bushes in the connecting rod. It has made a great improvement in power, but the engine knocks very badly on hills and when I slow down for corners; also it gets hot after a very short run of about eight miles, the crank case included, as I cannot hold my hand on it. I have timed the spark with the lever fully retarded, the piston on the top of the stroke, and the points just breaking. Is this correct? When I lift the exhaust there are two or three loud explosions in the silencer. What is the cause of this?—F.J.M.

The ignition is certainly timed a little early. It would be better to time it in this way, but with the spark two-thirds retarded. The cause of knocking may be due to too weak a mixture. Try closing the air when you wish to accelerate after slowing down; also retard the spark. The engine may improve a little after the new portions have become run in. The cause of the explosions in the silencer is that unburnt gas passes into it, and with the valve raised this is ignited along the exhaust pipe by the spark from the plug.

On page 239, col. 2, one line from the bottom, "eighty-five" should read "two hundred and fifty."

**EXPERIENCE WANTED.**

"T.R.F." (London). — Henderson, general reliability.

**READERS' REPLIES.**

**A Mysterious Noise.**

With reference to the above (August 30th, page 216) in a 1915 Scott, if your correspondent will carefully check the timing he will find the metallic clank he speaks of disappear. Also allow me to state that when a Scott is properly timed it is almost impossible to make the water boil. Mine will rev. for hours with a loaded sidecar without boiling.—1915 SCOTTIE.

**Difficult Starting.**

In connection with the question by "Leo" in *The Motor Cycle*, August 30th, on difficult starting, perhaps my experience would be of some help. My machine is a 1914 4½ h.p. L.M.C., three-speed hub and clutch, with hand or kick starter, and fitted with Bosch magneto. Up to this spring I have always had a difficulty in starting, and, in fact, latterly it was a perfect nightmare to me. The engine would not start at all with handle, and only after great difficulty by pushing; sometimes I had to run with it for a considerable distance, and just when I felt absolutely exhausted it would fire, and run O.K. afterwards. Last April I gave the engine a good clean, in preparation for this season, but the engine refused to fire, although with a plug on the outside of the cylinder it sparked all right. I tested the timing of valves and magneto, cleaned Senspray thoroughly, jet included, bound all connections with tape, held cloth over air intake, cleaned carbon brush, and took magneto off machine, cleaned it as well as I could, and warmed it up in the oven, but all to no avail. I laboured the whole of one Sunday, and was absolutely disgusted when I examined the high-tension wire connection at plug end and found that the wire was only connected up with half the strands. I cut this half off and connected up with the whole of the wire, put plug into cylinder, and turned the handle, and to my pleasant astonishment this solved the problem, as I have had no trouble since, starting easily with handle or push off at walking pace. Have you ever heard of such a case?—A. A. MURRAY.  
[We have not.—Ed.]

**RECOMMENDED ROUTES.**

**LINCOLN TO OSWESTRY.—M.C.**

Lincoln, Newark, Nottingham, Derby, Uttoxeter, Stone, Pipe Gate, Moore, Audlem, Whitchurch, Ellesmere, Oswestry.

**TORQUAY TO NORTHWOOD.—E.M.**

Torquay, Newton Abbot, Chudleigh, Exeter, Honiton, Ilminster, Ilchester, Wincanton, Hindon, Amesbury, Andover, Whitchurch, Basingstoke, Hook, Blackwater, Bagshot, Staines, Uxbridge, Ruislip, Northwood.

**IPSWICH TO BOURNEMOUTH.—E.E.J.**

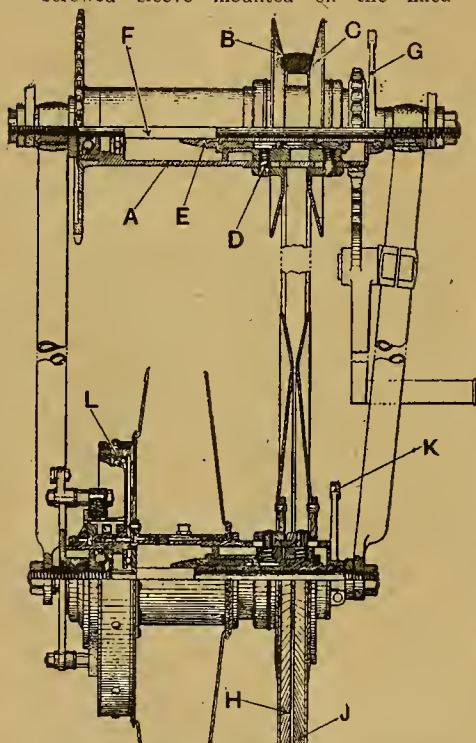
Ipswich, Colchester, Chelmsford, Bilerica, Tilbury, by ferry to Gravesend, Meopham, Wrotham, Ightham, Riverhead, Westerham, Redhill, Reigate, Dorking, Merrow, Guildford, Farnham, Alton, Alresford, Kingsworthy, Winchester, Romsey, Cadnam, Ringwood, Christchurch, Bournemouth.





### Variable Pulley Gearing.

The drawing illustrates a countershaft gear, in which the final drive is by means of a V belt running on variable pulleys. The construction is such that all the pulley flanges are moved simultaneously, so as to maintain a true belt line, whilst the operating mechanism is enclosed. A is a tubular countershaft driven by chain, gearing from the engine. Upon the countershaft are slidably mounted the pulley flanges B, C, and these are connected by dowel pins D to liners within the countershaft, which in turn are connected to sleeve nuts E, engaging a screwed sleeve mounted on the fixed

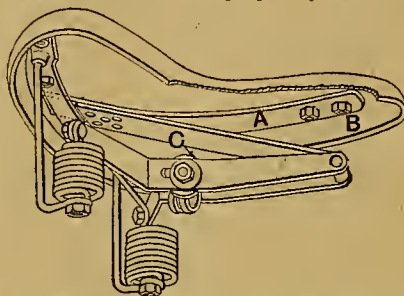


spindle F. This sleeve is provided with an operating lever G, and the two screw threads are of opposite sense, so that rotation of the sleeve moves the sleeve nuts and pulley flanges in opposite directions. Equivalent mechanism is provided to actuate the rear pulley flanges H, J, except that the sense of the threads is reversed, so that as the front pulley is opened out the rear flanges are closed. The operating lever K for the rear pulley is coupled up to the lever G, so that the two act in unison. The rear pulley is carried upon a sleeve mounted upon a fixed spindle, and the wheel is rotatable upon the sleeve, but may be coupled thereto by the cone clutch mechanism L. It will thus be seen that operation of the pulleys provides a gradually variable ratio, and a true belt line is maintained. At the same time

the tension of the belt may be caused to remain constant by suitably proportioning the screw threads operating the relative pulleys.—A. H. Johnson and L. Holmes, No. 107,504.

### A Saddle Improvement.

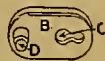
The perspective drawing given illustrates a simple and ingenious method of supporting the peak of the saddle so that it is free to yield vertically. Extending from the rear of the saddle to the forward end is a leaf spring A, which may be laminated if preferred. This spring is secured to the seat proper by studs B,



and is given an upward set, so that it tends to support the seat in a horizontal position, but is free to yield under shocks. The saddle frame is substantially of ordinary construction, but it will be seen that a strengthening bar C runs from the forward end of the frame to the rear.—R. W. Smith, No. 108,053.

### An Improved Belt Fastener.

It is an advantage with belt drive to reduce as far as possible the gap which exists between the ends, and the construction of the belt fastener illustrated produces this effect in a novel and ingenious manner. One illustration shows the belt fastener assembled, whilst the details are shown separated in the other views. It will be seen that the fastener comprises two end pieces A, and these are connected by means of a pair of plates B, each plate being formed at one end with a key-hole slot C, and at the other end with a peg D. By bringing the peg on one plate in line with the enlarged part of the slot on the other plate the plates may be caused to engage, the end pieces A first having been brought into position upon the pegs. The sides of the plates are



provided with facings to engage the pulley, and the effect is to produce a belt fastener, the centre part of which can be brought to the same section as the belt, so that in effect two very slight gaps only are required between the belt ends.—S. T. Robson, No. 106,445.

## SPARKLETS



### British Magnetos.

We are in receipt of a well-illustrated and attractive booklet, entitled "M-L All-British Magnetos." The pamphlet consists chiefly of a description of one of the biggest magneto works in this country.

### Old-time Cyclists.

The annual dinner of the Fellowship of Old-time Cyclists—which now numbers nearly four hundred members—will be held at the Connaught Rooms, Gt. Queen Street, London, W.C., on the evening of Wednesday, October 17th. The hon. sec. is Mr. W. J. Harvey, Holly Lodge, Gunnersbury, W.4, from whom further particulars may be obtained.

### Advance in Price.

The Palmer Tyre, Ltd., inform us that, owing to the increased cost of raw materials, they have been compelled to raise the prices of Palmer motor cycle covers by approximately 15%. There is, however, no increase in the price of Palmer inner tubes.

### Change of Address.

Messrs. Phelon and Moore, Ltd., have moved from their old depôts to larger premises at 4, Berners Street, just off Oxford Street. These constitute one of the largest motor cycle repair shops in London, and after the war showrooms will be established in this building.

### An Echo from the East.

From a far Eastern post comes the following letter from an A.C.U. member, now an officer in the R.F.A.: "As it is most unlikely that I shall be returning to Great Britain before a considerable period of service in the East, I trust that you will accept my resignation from the Auto-Cycle Union. I should like to place on record the fact that during the short time that I was in England the Auto-Cycle Union badge on my machine was responsible for much attention and consideration, both in garages and on the road, which I should not have received had I not been a member (touring) of the Club."

### J.A.P. Booklet.

We are in receipt of the J.A.P. booklet of the 4 and 5 h.p. twin engines, published by Messrs. J. A. Prestwich and Co., Ltd., Northumberland Park, Tottenham, London, N.17. This is a handbook which should be possessed by every J.A.P. owner, as it contains a vast amount of useful information. We are often asked if a certain engine will fit into a particular frame. Should the enquirer wish to fit a J.A.P. engine, if he turns to this booklet he will find all dimensions given, together with lucid diagrams. The whole book is beautifully illustrated with half-tone plates from sketches which have appeared in *The Motor Cycle*.



## THE DUNHILL M.C. JACKET & OVERALLS

AS SUPPLIED TO H.M. GOVERNMENT.

Planned on the saddle, so to speak, the garments combining smartness with perfect ease and freedom.

Made in Lightweight Materials, for Summer riding, and properly ventilated.

The quality is unequalled anywhere for the price.

**GUARANTEED ABSOLUTELY  
WATERPROOF.**

**PRICES :**

Jacket with belt .. .. £2-2-0

Seatless Trouser Overalls £1-4-0

# Dunhills

Ltd.,

359-361, Euston Rd.,  
London, N.W.

2, Conduit St., W.

Manchester :  
90-92, Cross Street.

Glasgow :  
72, St. Vincent Street.



# ABC British Challenge

The WORLD'S BEST  
MOTOR CYCLE  
(copyright).

*to the world  
to produce a  
more  
efficient engine  
still open.*

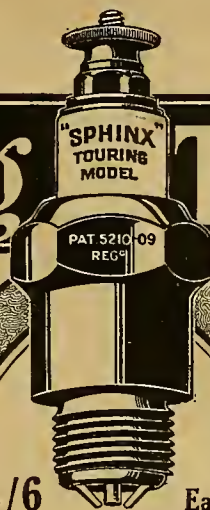
**A.B.C. MOTORS, LTD.,**

Walton-on-Thames.

'Phone : Walton-on-Thames, 220.  
'Grams : "Revs. Walton-on-Thames."



## Plug Talk



3/6 Each.

### A Million Salesmen

and more, are representing the Sphinx Company every day. Their "talk" is not word of mouth, but satisfactory service. These salesmen are the plugs themselves.

### Do they Succeed?

Well, the output of Sphinx plugs has multiplied year by year for more than a decade. To-day their worth is appreciated and their merit known in every corner of the World.

THEY ARE ALL-BRITISH.  
**The SPHINX MFG. CO.**  
BIRMINGHAM.

## Entirely British



*In answering these advertisements it is desirable to mention "The Motor Cycle."*



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILLIFFE & SONS LTD., and crossed**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Illiffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**A** BINGDON King Dick, 2 speeds, free engine, handle starter, good order, very strong; £23/10; sidecar to match cheap.—17, Goldhawk Rd., Shepherd's Bush, London. [7697]

### A.J.S.

**A** J.S. Spares: prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

**A** J.S. 1914½ 6hp. Combination, Binks, etc.; £58, lowest; excellent condition.—A. Townsend, Godmanchester, Hunts. [X5117]

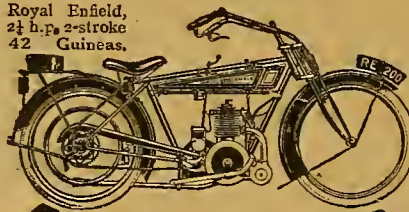
**6** h.p. A.J.S. Combination, 1913, in good order; only reasonable offer entertained.—Box 1,223, c/o The Motor Cycle. [X5113]

**A** J.S. 4hp., late 1915, in practically new condition, only done about 1,000 miles, with lamps and horn; £65, lowest price.—J. W. Jones, Sheephouse, Hay, via Hereford. [7558]

**19** 14 6hp. A.J.S. Combination, 3 lamps, 2 horns, speedometer, Dunlops, excellent condition, spare tube, large tool set, sidecar apron, mat, complete overhaul by makers 1916, mileage 5,000, whole very good condition; £70.—Box 1,230, c/o The Motor Cycle. [X5146]

**A** J.S. Late 1916 6hp. Combination, 3-speed, hand clutch, etc., spare wheel and tyre, luggage carrier, new Lucas lamps and generators; this outfit has only done 3,000 miles, and is in new condition; can be seen any evening after 7; must sell; £95, or nearest.—White, 37, Bracewell Rd., North Kensington, W. [7606]

Royal Enfield,  
2½ h.p. 2-stroke  
42 Guineas.



**DON'T FORGET — EVANS** closes at One on Saturdays, but any other time you can freely inspect his grand selection. Prices and terms are sure to suit.

Controlling Birmingham Agent for  
**INDIAN, ENFIELD, ROVER,  
BAT, NORTON, ZENITH,  
NEW IMPERIAL, A.J.S.,  
CONNAUGHT, CALTHORPE.**  
Also Agent for Triumph and James.

Note a few waiting your examination:

**CONNAUGHT**, 2½ h.p., 2-st. £28 17 6  
**CONNAUGHT**, 2½ h.p., 2-speed £36 6  
**ENFIELD**, 2½ h.p., 2-sp., 2-st. 42 gns.  
**ENFIELD**, 3 h.p., twin, 2-speed 55 gns.  
**ENFIELD** Combination ..... 90 gns.  
**JAMES**, 3½ h.p., 3-sp., twin .. £69 10  
**JAMES**, 4½ h.p., Combination £86 6  
**NEW IMPERIAL**, 2½ h.p., 2-sp. £40 19  
**NEW IMPERIAL**, 2½ h.p., clutch £48 6  
**NEW IMPERIAL**, lady's ..... £50 8  
**ROVER**, 3½ h.p., T.T., Philip-  
son ..... £62/17/6  
**ROVER**, 3½ h.p., T.T. racer. .... £57 10  
**ROVER**, 3½ h.p., c'at'rs'b't, 3-sp £73 10  
**ROVER**, 3½ h.p., 3-sp. Comb. .... £94 10  
**CALTHORPE-J.A.P.**, 2-speed £39 18  
**CALTHORPE**, lady's, 2-speed £37 16  
**CALTHORPE**, 3½ h.p., coach  
Combination ..... 70 gns.  
\* Plus 5 per cent.

Every selection—difficulty solved.  
Liberal Exchanges—Immediate  
Deliveries. Remember — at



87-91, John Bright Street,  
**BIRMINGHAM.**

Phone: Mid. 662. Wires: Lylecar, B'ham.



**'Hints and Tips for Motor Cyclists.'**

Brimful of useful information.

Price 1/6

By post 1/8

Home or abroad.

**ILLIFFE & SONS LTD., 20, Tudor St., E.C.4.**

## MOTOR CYCLES FOR SALE.

### A.J.S.

**A** J.S., 1916, 4hp., 3 speeds, h.b.c., kick starter, with sidecar, all tyres are nearly new, and the machine is in good order; £70.—Hulme, 469, Halliwell Rd., Bolton, Lancs. [X5125]

**A** J.S., 23½ h.p., 1914, 3-speed, clutch, T.T. bars, P. and H. head lamp and generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.I. [7562]

**A** J.S., 1915, 6hp., spare wheel, spring saddle-pillar, Lucas lamps, horn, Watford trip, fitted for substitutes, tandem sidecar, hood, screen, 6,000 miles; £95.—No. 1, Hyde Grove, off Shakespeare St., Manchester. [X5132]

**A** J.S., 1914, 6hp., 3-speed combination, hood, screen, 3 lamps, horn, 5 ga. Cowey, £77/10; also 1915 4½ p. combination, 3-speed, Lucas accessories, £85; demonstration, exchanges; easy payments by arrangement.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7714]

**A** J.S. 1916 De Luxe Combination, 6hp., 3-speed, best sidecar, hood, screen, side curtains, detachable wheels and spare wheel, speedometer, mechanical horn, 3 lamps, as new, spare valve, etc., 105 gns.; A.J.S. 1913 6hp. combination, good order, 45 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. [7912]

### Alldays.

**COLMORE** Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796]

**19** 16 Alldays Allon, 2-speed countershaft, as new; 29 gns.—Broom, 77, Marylebone Lane, W. [7642]

**A** LLDAYS Allon, 2-speed, splendid condition; £24.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7623]

**R**IDER TROWARD and Co., 31 and 78, High St., Hampstead.—Alldays Allon, 1916, 2-speed, 2-stroke; 27 gns. (D) [7428]

**A** LLON, 23½ h.p., 1915, 2-stroke; £25; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7818]

**A** LLONS, 2-speed 2-stroke models, 1917, £42; extended payments at 2% only.—Wauchope's, 9, Shoe Lane, London. [7839]

**A** LLDAYS Matchless, 3½ h.p., 3 speeds, countershaft, combination in nice condition; £38.—Percy and Co., 337, Euston Rd., London. [7570]

**A** LLON, 1916, guaranteed perfect throughout, new tyre and belt, 110 m.p.g.; bargain, £23, or nearest offer.—5, Norwich Rd., Ipswich. [7746]

**19** 16½ Allon, 23½ h.p., 2-stroke, 2-speed, new overdrive tyres, 90 m.p.g., perfect running; any trial; £28.—48, Liverpool Rd., Islington, London. [7599]

**A** LLDAYS Allon, 1915, 23½ h.p., single speed, 2 stroke, in new condition, with insurance, spare some petrol.—73, Victoria Rd., Stroud Green, N.4. [7845]

**A** LLON, new, 23½ h.p., 2-stroke, single speed; £39/12; the stout-hearted lightweight; extended payments arranged.—Harrod Motor Showrooms, 118, Brompton Rd., London, S.W.1. [7894]

**A** LLON, 1915, 2-speed, 2-stroke, pan saddle, £39/10 single speed (new), £36; 2-speed, new, £42; 2-speed and hand clutch, new, £45; extended payments or exchange; Alldays Allon, 1915, 2-speed, Dunlop tyres, enamelling and plating good, £30/17/6.—Service Co., 292, High Holborn. [X5164]

### Ariel.

**A** RIEL, 3½ h.p., 1917, 3-speed countershaft models in stock.—Crow Bros., Guildford. [2562]

**COLMORE** Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797]

**FOR** Sale, 3½ h.p. Ariel, good condition; very cheap.—Apply, The Gardener, Dorincourt, Kingston Vale Putney. [X4881]

**FOR** Sale, Ariel (1912), in excellent condition, 3½ h.p. variable pulley, free engine; £24.—Trolley, High St., Banbury, Oxon. [7631]

**19** 14 Ariel, 3½ h.p., purchased 1915, 3-speed countershaft gear, kick starter, coachbuilt sidecar, excellent condition; £45.—Parker and Son, St. Ives, Hunts. [7881]

**A** RIEL, 1915, 3-speed, and clutch, 5½ h.p., spare seat-pillar, Dunlop tyres, hood and screen, Lucas lamp and Cowey speedometer; £71/15; extended payments or exchange.—Service Co., 292, High Holborn. [X517]

**A** RIEL (new), 3½ h.p., 3-speed countershaft gear clutch and kick starter, decompressor, patent spring seat pillar; £72; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [7899]

### Arno.

**19** 15½ Arno, 3½ h.p., almost new; £25.—20, White St., Reading. [7688]

### Auto-Wheels.

**FOR** Sale, two Auto-wheels, in good condition; who offers?—Apply, C.G., 22, Godstone Rd., Purley. [7688]

**G**ENUINE Well Auto-Wheel, complete, little use, splendid condition; £8/10.—Murray, 37a, White St., Hutton Garden, Holborn. [X513]



# MOTOR CYCLES FOR SALE.

## Auto-Wheels.

**A**UTO-WHEELS. B.S.A., ridden approximately 700; 1914 standard model, good order, £7/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7719]

## Blumfield.

**B**LUMFIELD Late 5-6h.p. Twin, mag., new Dan-lous; £25/10.—Wandsworth Motor Exchange, Eber St., Wandsworth (Town Station). [7942]

## Bradbury.

**19**11 4h.p. Bradbury 2-speed Combination; £23/10; exchange.—53, Brownhill Rd., Catford. [7795]

**B**RADBURY and Sidecar, 1913 model; £32/10; trial; guaranteed.—Wanchope's, 9, Shoe Lane, London. [7642]

**B**RADBURY, 1912, 5½h.p., 2 speeds, chain drive, free engine; £25/10.—Motor Exchange, Horton St., Halifax. [7646]

**19**12 4h.p. Bradbury, nearly new Bowden gear box, coach sidecar; £25, cash only.—Poate's Garage, Havant, Hants. [X5027]

**19**12 Bradbury Combination, C.B. sidecar, N.S.U., done 5,000 miles; £25.—Owen Arison, New St., Middlesbrough, Huddersfield. [X5009]

**B**RADBURY, 3½h.p., 3-speed, clutch, sidecar, lamps, tools, horn, sound tyres, excellent condition; £30 for quick sale, a bargain.—Box 1,231, c/o The Motor Cycle. [X5120]

**R**IDER TROWARD and Co., 31 and 78, High St., Hampstead.—Bradbury, 1914, 4h.p., 2-speed countershaft, coach sidecar, 59 gns.; 1912 single speed Bradbury, 16 gns. (D). [7429]

**N**EW 1917 Bradbury Motor Cycle, bought July; owner not to ride it; 4½h.p., 3 speeds, h.b. clutch control, kick start, all chain drive; £60.—J. W. Rigby, Liverpool Rd., Longton, Preston, Lancs. [7597]

**L**ATE 1913 Bradbury Combination, onne sidecar, 2-speed countershaft gear, Bosch waterproof mag., B. and B. carburettor, all accessories, fine puller, good tyres, in splendid condition throughout; £35.—Ravenscroft, Park Rd., Chesterfield. [X5102]

## Brown.

**F**OR Sale, 3½h.p. Brown, adjustable pulley, Bosch mag., just overhauled; £14.—Ronald W. Horsier, Sundon, Post Office, near Dunstable, Beds. [7613]

## B.S.A.

**B**.S.A., 4½h.p., 3 speeds, brand new, with speedometer; £66.

**B**.S.A., 1916, 4½h.p., 3 speeds, all chain drive; £58.

**B**.S.A., 1916, 4½h.p., 3 speeds, combination; £65.

**B**.S.A., 1915, 4½h.p., 3 speeds, all chain drive, combination; £58; exchanges and deferred payments.—Percy and Co., 337, Euston Rd., London. [7571]

**C**OLMORE Depots 261, Denagate, Manchester, for immediate delivery of B.S.A. [0798]

**B**.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Denagate, Manchester. [0888]

**B**.S.A., late 1915, 3-speed, expensive accessories, absolutely like new; £48.—Box L4,483, c/o The Motor Cycle. [7903]

**B**.S.A., 1915, 4½h.p., 3-speed, with coach sidecar, lamps, and horn; £55.—Batchelor, Clarence St., Kingston. [7765]

**2** 1/2 h.p. B.S.A., 1913, with sidecar, exceptionally fine condition, very little used.—Box 1,221, c/o The Motor Cycle. [X5111]

**B**.S.A., 3½h.p., 1912, free engine, with T.T. handlebar, excellent order; £26.—Eagles and Co., High St., Acton, W.3. [X5097]

**B**.S.A., 1914, 2-speed, 3½h.p., in fine running order; £35/5; exchange or extended payments.—Service Co., 292, High Holborn, London. [X5168]

**B**EAUTIFUL B.S.A. Combination, 1916½, splendid condition; cost £97, what offers?—Stanley, 43, Nyndeliff Rd., Charlton, London, S.E. [7601]

**B**.S.A., 4½h.p., 1915 Model H, 3 speeds, all chain drive; £48; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7825]

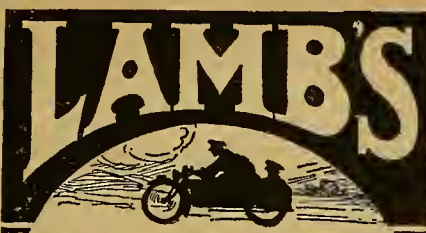
**B**.S.A., single, 1915, T.T. Model D, little used, thorough order, tyres good as new; £35.—S. A. Tudor, Stone Green, Palfeld, Gloucestershire. [7637]

**B**.S.A., 4½h.p., 1914, Model K, 3 speeds, chain-cum-belt drive; £40; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7825]

**B**.S.A. Model K, makers' guarantee, November, 1916, spare belt, valves, Renolds chain, lamps, horn, with Montgomery sidecar, as new; £63.—Box L4,441, c/o The Motor Cycle. [7582]

**B**.S.A., 3½h.p., late 1913, 2 speeds, clutch, kick starter, new tank, frame, cane sidecar, 2 new res., chain driven, lamps, horn, tools; side away; £35.—Sgt. Major Beeson, Drill Hall, Guildford. [7735]

**B**.S.A. 1916 Chain-cum-belt Coachbuilt Combination, 62 gns.; also 1915 B.S.A., 2-speed, clutch, running der, but wants a little attention, 19 gns.; details free. Rider Troward and Co., 31 and 78, High St., Hampstead. (D). [7913]



## NEW MACHINES ACTUALLY ON SHOW.

**MATCHLESS** War Model 8 h.p. Combination, 3-speed, spare wheel ..... £120 0  
**ENFIELD**, 1917, 2½ h.p., 2-speed, 2-stroke. £44 2  
**ENFIELD**, 1917, 6 h.p., hood, screen ..... £120 0  
**HARLEY-DAVIDSON**, 1917, magneto model, with H.D. "C" Sidecar ..... £130 0  
**ROVER**, 1917, 3½ h.p., 3-sp., countershaft Combination, with Sidecar ..... £99 4/8  
**JAMES**, 1917, 3½ h.p. twin, 3-speed ..... £69 10  
**JAMES**, 1917, 4½ h.p., No. 6, 3-sp. Comb. £87 2  
**ARIEL**, 1917, 3½ h.p., 3-speed Combination £93 10  
**LEVIS**, 1917, 2½ h.p., 2-speed, Model E .. £47 10  
**LEVIS** Popular Model ..... £32 0  
**CALTHORPE-J.A.P.**, 1917, 2½ h.p., 2-sp., Enfield gear ..... £39 16  
**CALTHORPE-J.A.P.**, 1917, 2½ h.p., 2-sp., with Sidecar ..... £50 0  
**ALDOAYS ALLEN**, all models from ..... £37 10  
**ROYAL RUBY**, all models from ..... £32 10

## SECOND-HANDS.

**ENFIELD**, 1916, 6 h.p. Combination, lamps, hood, speedometer, screen ..... £84 0  
**ENFIELD**, 1914, 6 h.p. Combination, 3 lamps, horn, engine just been overhauled ..... £68 10  
**ENFIELD**, 1917, 6 h.p. Combination, only ridden approximately 1,500 miles ..... £94 10  
**ENFIELD**, 1916, 6 h.p., and accessories, condition like 1917, original tyres still on ..... £89 10  
**ENFIELD** Family Sidecar, 1914 ..... £10 0  
**ENFIELD**, 6 h.p., new Jan., 1917, beautifully fitted up ..... £94 10  
**MATCHLESS** 1914 8 h.p. J.A.P. Combination, speedometer, lamps, and horn .. £45 0  
**O.K. JUNIOR**, 1914, 2-stroke ..... £20 0  
**INDIAN**, 1915-16, 7-9 h.p., clutch model, T.T. bars, disc wheel, with lamps and horn, ridden approximately 1,000 miles ..... £55 0  
**TRIUMPH**, 1913, 3½ h.p., 3-sp., semi-T.T. bars; a nice little solo mount ..... £32 10  
**TRIUMPH**, 1914, 4 h.p., 3-sp., Sturmer-Archer gear, Millford Sidecar, speedometer, lamps ..... £48 10  
**DOUGLAS**, 1914, 2-sp., kick-starter model, all accessories ..... £42 0  
**DOUGLAS**, 1914, 2-speed Touring Model, with accessories, ridden approximately 500 mdes, unsratched ..... £45 0  
**HARLEY-DAVIDSON**, 1915, magneto model, and Phoenix Sidecar ..... £72 10  
**HARLEY-DAVIDSON**, 1916, 7-9 h.p. Swan Combination, lamps, horn, semi-T.T. bars, hood ..... £89 10  
**HARLEY-DAVIDSON** 1915 magneto model Combination ..... £75 0  
**HARLEY-DAVIDSON**, 1915, 3 h.p., Stewart warmer, and Imperial Sidecar to match ..... £75 0  
**SINGER**, 1913, 4½ h.p., 2-sp., countershaft, and splendid cane Sidecar, lamps, and horn, and speedometer ..... £35 0  
**ARIEL**, 1915-16, 3½ h.p., countershaft Combination, kick-starter, decompressor, speedometer, lamps, horn, original tyres still on ..... £72 10  
**JAMES**, 1914, 3-sp., 4½ h.p. coach Combination, lamps, and horn ..... £45 0  
**A.J.S.**, 1914, 6 h.p. Combination, 5 gu. speedometer, 3 lamps, horn, wind-screen, hood ..... £77 10  
**CALTHORPE-J.A.P.**, 1915, 2-sp., lamps, horn, original tyres still on, unused last 15 months, like new ..... £28 10  
**LEVIS** (Baby), 2½ h.p., fine condition ... £23 10  
**LEVIS** Popular, 1916, with speedometer and accessories ..... £27 10  
**SUNBEAM**, 1917, 3½ h.p., 3-speed, kick-starter, T.T. model speedometer, Lucas lamps, and Stewart horn, as new £32 0

# LAMB'S,

151, HIGH ST.,  
WALTHAMSTOW,  
N.E.17.

'Phone: Walthamstow 169.  
5 minutes Hoe St. (G.E.R.)

Also at 50, HIGH RD.,  
WOOD GREEN, N.22

Only depot in this district.  
'Phone: Hornsey 1855.  
Hours—9 to 6.  
Thursdays, 1 o'clock.

# MOTOR CYCLES FOR SALE.

## B.S.A.

**B**.S.A., 1914-15, 3-speed countershaft, with Caneolet sidecar, splendid condition, Lucas horn and lamp, spare belt; £45.—57, Naylor Rd., Peckham. [7798]

**B**.S.A., 4½h.p., countershaft 3-speed gear, free engine, and kick starter, includes all accessories, mechanically sound as new; £50; guaranteed.—Wanchope's, 9, Shoe Lane, London. [7840]

**B**.S.A. 1914 Combination, 4½h.p., 3-speed countershaft, complete with lamps, horn, and hood and screen, excellent condition; £47/10.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [7559]

## Calcott.

**C**ALCOTT, 1914, 2½h.p., 3-speed; 19 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D). [7441]

## Calthorpe.

**C**OLMOKE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

**19**15 2-speed Calthorpe-Jap. In good condition; £25; seen any time.—Bounds Garage, 225, High Rd., Kilburn. [7680]

**C**ALTHORPE, 1916, 2½h.p., 2-speed, 2-stroke, tyres and condition good; £25.—30, Church Rd., Southgate Rd., N.1. [7728]

**C**ALTHORPE-J.A.P.'s, 2½h.p., new 1917 models from stock; £39/18; gradual payment at 2% only.—Wanchope's, 9, Shoe Lane, London. [7841]

**19**16 2-stroke 2-speed Calthorpe, lamps, horn, tool-bags, pump, condition practically as new; £27.—Parker and Son, St. Ives, Hunts. [7883]

**19**16 Calthorpe-Jap, 2½h.p., Enfield 2-speed, speedometer, as new; £31, or exchange higher power.—C.S., Clayhall Tavern, Old Ford Rd., Bow. [7699]

**B**ARGAIN.—Nearly new Calthorpe, 2-stroke, 2-speed, better than new, only done 800 miles; 8 gallons petrol; £27/10.—Howe, High St., Nuneaton. [X5115]

**C**ALTHORPE, 1917 J.A.P., latest model, brand new, Enfield 2-speed, in stock; 39 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7519]

**C**ALTHORPE, 1917, 2-stroke, Enfield 2-speed, latest model; 34 gns.; brand new, in stock.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7520]

**C**ALTHORPE, 2½h.p., 1915, 2-stroke, 2 speeds, lamps and horn; £27; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7819]

**C**ALTHORPE-J.A.P., 2½h.p., 1915, Enfield 2-speed, Amac, Dixie disc wheels, mechanical horn, good condition; £20.—Tweedy, The Priory House, Monmouth. [7730]

**C**ALTHORPE 2-stroke, Enfield 2-speed, new, but slightly shop-soiled; special bargain, 30 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7521]

**19**16 Calthorpe, 4h.p. twin J.A.P., Enfield 2-speed gear, sporting sidecar, handle starting, chain drive, absolutely top hole order; 50 gns.—Batchelor, Clarence St., Kingston. [7767]

## Campion.

**C**AMPION Combination, 1916, 6h.p. J.A.P., 20 gn. coach sidecar, lamps, horn, 2-speed, clutch, and kick starter, fine condition; £69.—Glenn, Uppingham. [7865]

**C**AMPION, 1917, 8h.p. J.A.P. engine, 4-speed Jardine gear box, coachbuilt sidecar, speedometer, indistinguishable from new; £85.—Percy and Co., 337, Euston Rd., London. [7578]

## Chater-Lea.

**C**HATER-LEA No. 8 Combination, 8h.p., 3-speed, chain, splendid condition; £45, or nearest.—Lorimer, Vine Post Office, Sevenoaks. [X5082]

## Chater-Lea-Jap.

**8** h.p. Chater-Lea-Jap Combination, 3 speeds, 1913; £45.—16, Glen Rd., Heworth, York. [7886]

## Clyno.

**5**-6h.p. Clyno Motor Cycle and sidecar, 1916, War Model, in tip-top condition.—Box 1,220, c/o The Motor Cycle. [X5110]

**19**14 5-6h.p. Clyno, with Phoenix double seated sidecar, wind screen; £65.—Thompson, 44, Windermere Rd., Enlins. [7738]

**C**LYNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham and Manchester; inclusive price with spare wheel, 100 gns [0884]

**C**LYNO Combination, 1914, twin engine, countershaft 3-speed gear, clutch, and kick starter, fitted with family sidecar to take 2 children, all accessories.—Wanchope's, 9, Shoe Lane, London, E.C. [7843]

**C**LYNO 6h.p. 1914 Combination, sporting sidecar, disc wheels, Lucas electric lighting set and electric horn; £65; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7820]

**C**LYNO Combination, 6h.p., kick start, coachbuilt, engine been overhauled, speedometer, mirror, lamps, spares, tyres and tubes, tyres almost new, all in sound and reliable condition; £40.—H., 36, Albert Rd., Pelvedere. [X4882]

**C**LYNO, 1913-14, 5-6h.p., 3-speed, and sidecar, P. and H. lamp set, Coway and horn, sidecar complete with spare wheel, £62; 1914-15, 3-speed, 5-6h.p., and sidecar, £69; exchange or extended payments.—Service Co., 292, High Holborn, London. [X5171]



## MOTOR CYCLES FOR SALE.

## Clyno.

CLYNO 1913-14 5-h.p. Coachbuilt Combination, with spare wheel, electric lighting, latest clutch and gear box fitted 1916, overhauled and re-enamelled 1917, all spares, including 2 covers (one new), 2 chains, etc., Jones speedometer, Million, perfect condition; seen any time; £55.—Hickey, 43, Amphill Sq., N.W.1. [7868]

## Connaught.

CONNAUGHT, 2-stroke, 2-speed, T.T. bars, new Dunlop tyres; £23.—Deane, Matlock Bath, Derbyshire. [X5057]

CONNAUGHT, 2½ h.p., 1915, 2-stroke, T.T. handlebar, variable ignition, all accessories; £20.—Eagles and Co., High St., Acton, W.3. [X5098]

CONNAUGHT Miniature, single speed, £33/17/6; ditto, 2-speed, £41/8/6; standard 2-speed, £44/9; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5177]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new; 42 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5181]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Coventry Eagle, 1917, 2-speed, 2-stroke, in stock; 39 gns. (D) [7914]

## Douglas.

DOUGLAS Motor Cycles, brand new, delivery from stock against priority permits.

DOUGLAS, 1916 4 h.p., 3 speeds, combination, as new; £75.

DOUGLAS, 1915, 4 h.p., 3 speeds, combination; £70.

DOUGLAS, 1915, 2½ h.p., 2 speeds, in good condition; £42.

DOUGLAS, 1914, 2½ h.p., 2 speeds, in good condition; £38.

DOUGLAS, 1913, 2½ h.p., 2 speeds, in good condition; £31.

DOUGLAS, 1911, in real good order; £17; exchanges and deferred payments.—Percy and Co., 337, Euston Rd., London. [7573]

DOUGLAS, 1915-16, perfect, under 2,000, accessories; £43.—Seen Popplewell's, Ipswich. [7729]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

2½ h.p. Douglas, 1915, in splendid order, Colonial 4 Model.—Box 1,222, c/o The Motor Cycle. [X5112]

DOUGLAS, 2½ h.p. (1914), in excellent condition, for sale; £34.—Trolley, High St., Banbury, Oxon. [7658]

1912 2-speed Douglas, clutch, beautiful condition; £26.—Sellers, The Motor Cycle Specialist, Dorchester. [7873]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat Yeovil Tel. 50. [5855]

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [7800]

DOUGLAS, 1913, 2½ h.p., 2 speeds, T.T. handlebars; £31/10; 1912 2½ h.p., 19 gns.—Motor Exchange, Horton St., Halifax. [7647]

1915 4 h.p. Douglas, 3 speeds, combination, screen, 2 Millers head lights; 66 gns.—Prince, 49, Longbridge Rd., Barling. [7867]

DOUGLAS, 1913, 2-speed, Bosch mag.; £35/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5175]

DOUGLAS, 1912, 2-speed, T.T. bars, perfect order; seen in Basingstoke; £18.—Apply, J.A.H., 49, Cleveland Rd., Southsea. [X5105]

DOUGLAS, 4 h.p., 1914, clutch model, in good condition; £45; or exchange 1914-15 2½ h.p. Douglas.—George Deans, Baldock. [7753]

1914 2½ h.p. 2-speed Douglas, new tyres and belt, perfect condition; offers wanted.—Procter, Station Rd., Crosshills, Keighley. [X5131]

1914 T.T. Douglas, 2-speed countershaft gear, new tyres, lamps, etc.; £30; or nearest offer.—43, Mortimer Rd., Kensal Rise. [7727]

DOUGLAS, 1914, 2½ h.p., T.T. model, 2 speeds, lamps, speedometer, horn, as new; £38.—136, Ravensbury Rd., Earlsfield, London. [7758]

DOUGLAS, genuine 1914, 2½ h.p., Bosch, 2 speeds; 32 gns.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [7943]

1914 2-speed T.T. Douglas and accessories, in good condition; £33/10; seen any time.—Bounds Garage, 223, High Rd., Kilburn. [7678]

DOUGLAS 2½ h.p. 1915 Twin, 2 speeds; £45; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7817]

DOUGLAS, 2½ h.p., 2-speed, kick starter, late model, unused 18 months; £35; or exchange.—T. 85, Revelstoke Rd., Wimbledon Park, S.W. [7890]

DOUGLAS 2½ h.p., 1914 model, 2-speed gear, fitted with Lucas belt accessories throughout; £42; guaranteed.—Wanchope's, 9, Shoe Lane, London. [7835]

DOUGLAS, 2½ h.p., late 1913 model, 2 speeds, clutch, thoroughly overhauled, new tyres; £35.—Partners, write 15, Ashburnham Grove, Greenwich. [7632]

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WE REQUIRE the undermentioned OUTFITS. Must be mechanically sound throughout:

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SCOTT, 3½ h.p., 1914, 2-speed, kick-start, Myers Sidecar Chassis only ..... £50 0

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SWIFT, 1915, 10 h.p., dynamo lighting, clock, and speedometer; just overhauled and repainted. As new ..... £225 0

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ALLDAYS ALLON, 1917, 2-speed, and clutch; only ridden 25 miles, and as new ..... £40 0

LUGTON, 1915, 3½ h.p., good tyres, fine solo mount. Cheap ..... £24 0

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RUDDGE 3½ h.p. clutch model, just overhauled, and new tyres fitted ..... £26 0

CALTHORPE, 1915, 2-speed, 2-stroke, adjusted to run on paraffin ..... £22 0

BAT-J.A.P., 5-6 h.p., special T.T. model, round tank. Very fast ..... £20 0

ARIEL, 2½ h.p., 3-speed, lightweight, magneto. Like new ..... £22 0

BRADBURY, 3½ h.p. horizontal twin, 3-speed, countershaft gear, kick-start, requires repairs ..... £32 0

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## MOTOR CYCLES FOR SALE.

## Douglas.

DOUGLAS, 4 h.p., 2-speed, clutch, kick start, coachbuilt sidecar, practically unmarked; £75.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7624]

1912 2½ h.p. Douglas, 2-speed, speedometer, 2 spare valves, lamps, complete, £28, perfect condition; coach sidecar for above, £6/10.—Riley, Lichersdale Rd., Crosshills, Keighley. [X5130]

DOUGLAS, late 1913, 2 speeds, kick start model, new tyres, belt, not used for 2 years; £30; or exchange Matchless, Enfield, or Indian combination, cash adjustment.—34, Ashvale Rd., Totting, S.W. [7790]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 4 h.p. Douglas coachbuilt combination, 3-speed, 59 gns.; 1915 Douglas, 2½ h.p., 3-speed; 39 gns.; 1914 Douglas, 2-speed, T.T., 34 gns. (D) [7915]

DOUGLAS, late 1913 countershaft model, 2-speed and free engine, kick start, Bosch mag., auto. lubrication, speedometer, lamps, tyres excellent; £30, lowest; seen by appointment.—20, Thornbury Av., Isleworth. [7783]

DOUGLAS, 1913, 2½ h.p., 2-speed, semi T.T. bars, long exhaust, just had new clutch and kick start fitted, in splendid condition, all accessories, lamps, and new back tyre; £35.—Seen at Watson's Garage, Basingstoke, or write E. Dapsfield, Wootton Vicarage, Basingstoke, Hants. [7602]

DOUGLAS, 1914, 2-speed, 2½ h.p., touring model, kick start, accessories, £42; also 1914 2-speed, 2½ h.p. model W. kick start, ridden only about 500 miles, absolutely as new; £45; also 1912, 2-speed, clutch model, £20.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7715]

BEST Bargain This Week—Genuine late 1915 4 h.p. Douglas combination, 3 speeds, kick start, complete with all accessories, including new Dunlop on back; this outfit was bought new 1916, and has not done 2,000 miles, and is equal to new; lowest price £65.—Apply, 11, Higher Albert St., Chesterfield. [X5122]

2½ h.p. Douglas, absolutely new: immediate delivery of models U, V, W, clutch, kick start, against priority permits, for doctors, farmers, war and munition workers. How and where to apply.—For full particulars, write to the Douglas Specialists, Robinson's Garage, Green St., Cambridge Tel.: 368. T.A.: Bicycles. [7775]

## Edmund.

EDMUNDS (new), 2½ h.p. J.A.P., Royal Enfield 2-speed, spring frame, double tank, strongly-built machine; £54/12/6; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [7896]

## Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 5 h.p. Twin; £57/10; and 2½ h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [7639]

1916 Enfield Combination, in perfect condition; £75, bargain.—16, York St., Dover. [7804]

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [7801]

ENFIELD 1914 Combination, 2 speeds, new tyres, 6 h.p.; £45.—51, Maplethorpe Rd., Thornton Heath, S.E. [7780]

1916 2½ h.p. Enfield, 2-stroke, 2 speeds, in fine order; £34.—Batchelor, Clarence St., Kingston-on-Thames. [7764]

1915 Enfield, 3 h.p., 2-speed, clutch, kick start, lamps, horn, speedometer, in splendid order; £38.—Below.

1916 Enfield Combination, Chp., Lucas dynamo lighting, horn, mirror, speedometer, hood, screen; £105.—Elce and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [7051]

1914 Royal Enfield Motor Cycle, 2-cyl., 3½ h.p.; offer.—Apply, Autolee, St. Peter's Court, Lo Green 707. [7615]

1917 3 h.p. T.T. Enfield, run only 300 miles, as new, complete, lamps and horn; £55.—Batchelor, Clarence St., Kingston. [7764]

1916 2-speed T.T. Enfield and accessories, as good as new; £44; seen any time.—Bounds Garage, 223, High Rd., Kilburn. [7677]

ROYAL Enfield 3 h.p. 1915 Twin, 2 speeds; £40; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7813]

ROYAL Enfield, 2½ h.p. 1916, 2-stroke, 2 speeds; £38; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7814]

ENFIELD Combination, hood, screen, lamps, horn, speedometer, run 5,500, excellent condition; £50.—4, Thornton St., Kempston, Bedford. [7880]

ENFIELD, 1916, 6 h.p., new 2-senter s.c. hood, screen, speedometer, lamps, complete; £67.—Crouch, 54, Newton St., Hoxton, London, N.1. [7850]

ENFIELD Combination, 3 h.p., 1916, petrol or paraffin, lamps, speedometer, spare parts, splendid condition.—Morse, 69, Sotheby Rd., Highbury. [7940]

ENFIELD Combination, 1913, engine perfect, thoroughly overhauled, rebushed, as new, 2 new Dunlop, accessories; £50; appointment.—Deul, Outlands Lodge, Weybridge. [7741]



**MOTOR CYCLES FOR SALE.**

**Enfield.**

**ENFIELD** Combination, 6h.p., 2-speed, splendid condition, fast and reliable, head and tail lamps; £48/10.—J.B., 17, Woodland Villas, South Chingford [7857]

**ROYAL Enfield** 3h.p. 1917 Twin, 2 speeds, lamp, horn, and speedometer; £50; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7815]

**ENFIELD**, 6h.p., late 1914, 2-speed, handle starter, good tyres, coachbuilt sidecar, head lamp, generator, rear lamp, fully equipped, and perfect throughout; bargain, £65. Below. [7815]

**ENFIELD**, 2½h.p., 1914, 2-speed, kick starter, all chain drive, Enfield grey, good tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout; bargain, £34.—Mebs and Mebs, 156, Gt. Portland St., W.1. [7261]

**ENFIELD** 6h.p. Combination, late 1916, only used week-ends, condition perfect; 78 gns., with petrol in free.—Harrington, Chemist, 137, Woodlands Rd., Ilford, Sussex. [7589]

**ENFIELD**, 1913-14, 2-speed, 6h.p. J.A.P., sidecar, coachbuilt, 3 lamps, large generator, accessories, spares; genuine bargain; 100 miles trial; £49.—Read, 1, Hare St., Bethnal Green. [7731]

**ROYAL Enfield** 6h.p., 1916 Combination, D.A. lighting set, Lucas horn, Cowey speedometer, etc.; £75; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7831]

**6h.p. Enfield** Combination, 1915, complete with all accessories, ready for the road; also 1914 model, in nice condition; full particulars on application.—Wauchope's, 9, Shoe Lane, London. [7836]

**ROYAL Enfield** 6h.p., 1916 Combination, Lucas dynamo lighting set, electric horn, speedometer, hood and wind screen, as new; £105; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7816]

**ROYAL Enfield**, 3h.p., twin-cyl., kick start, brand new; cost £57/15; invoice will be produced; too heavy for owner, an elderly gentleman; price £56.—Mr. Lawford, Padworth House, Ray Mead Rd., Maidenhead, Berks. [7595]

**6h.p. Royal Enfield** Combination, June, 1915, in fine condition, Lucas dynamo lighting set, new tyres, horn, speedometer, spare chains, and spare valves, full kit of tools and luggage grill; £80.—Grainger, 542, Attarcliffe Rd., Sheffield. [X5121]

**ENFIELD** 6h.p., 1916 Combination, Palmer cord light car tyres all round, large head lamp, generator, rear lamp, luggage carrier to sidecar; very nice condition throughout, and fully equipped; £90.—Advertiser, 156, Gt. Portland St., W.1. [7904]

**ENFIELD** Combination, 6h.p., late 1916, mileage 2,700, electric lighting and horn, speedometer, watch holder, Pillion seat, back-rest, wind screen, etc., condition perfect, unsratched, cannot tell from new; £95; after 4.30 p.m.—Hughes, 304, Elgin Av., Maids Vale, London, W. [7777]

**ENFIELD** 1916 Combination, 6h.p., 2-speed, combined clutch, Amac carburettor, Bosch mag., fitted with mechanical horn and speedometer, only done 2,000 miles, £85; 1915 combination, 6h.p., 2-speed, clutch, Thompson-Bennett mag., Amac carburettor, fitted with lamps, Stewart speedometer, and horn, £87/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [X5135]

**ENFIELDS** Actually in Stock.—New 1917 6h.p. model with H.D. and screen, £120; 1917 6h.p. combination, ridden approximately 1,500 miles, all accessories, £94/10; 1916 6h.p. combination, heap accessories, condition like new, 1917, £89/10; also another, outward appearance not quite as good, but with hood and screen, £84; also 1914 6h.p. combination, condition and appearance beyond criticism, £68/10; trial with pleasure; exchanges; E.P. by arrangement.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7713]

**Excelsior.**

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—British Excelsior, 1914, 5-6h.p., 2-speed countershaft, 20 gn. coach sidecar; 49 gns. (D) [7918]

**1913 British Excelsior**, 4½h.p., C.B. sidecar, Walbro wind screen, 2-speed and clutch, guaranteed and fitted for paraffin; 30 gns., or offers.—54, Lower Denmark Rd., Ashford, Kent. [X5147]

**EXCELSIORS**—All models in stock; magneto model £75, electric lighting model £85; get a big X. You'll be satisfied.—Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester. [X1462]

**AMERICAN Excelsior**, Model de Luxe, 7h.p., 3-speed, dynamo lighting outfit, speedometer, coachbuilt sidecar, perfect condition, done only 1,500 miles; £65.—Sellers, The Motor Cycle Specialist, Dorchester. [7874]

**F.N.**

**F.N. Motor Cycle**, 4-cyl., cheap.—Apply, Autolee St., Peter's Court, Lee Green 707. [7616]

**F.N.**, 1911, 5-6h.p., 2-speed, free engine, in going order, tyres good, F.R.S. lamp and accessories; £12, or near offer; stamp, reply.—40, Frodingham Rd., Scunthorpe. [7667]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—F.N. 7-9h.p. combination, coachbuilt, latest mechanical valve model, 3-speed gear box, hand and foot clutch, kick start, fully equipped; 73 gns. (D) [7916]



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A SATISFACTORY DEAL GUARANTEED.**

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1914 3½ h.p. T.T. ROVER, new Philipson pulley fitted .....	£40 0
1913 DOUGLAS, 2-speed, accessories ..	£32 10
1917 2½ h.p. GALTHORPE - J.A.P., Enfield gear, new .....	£33 18
1917 2½ h.p. EXCELSIOR-J.A.P., 2-sp., and clutch, new .....	£48 0
1917 20 h.p. EXCELSIOR, 2-stroke, 2-sp., and clutch, new .....	£44 2
1917 2½ h.p. ALLON, 2-stroke, 2-speed, and clutch, new, cancelled order; cost £49 10s. ....	£44 10
1915 2½ h.p. HOBART-VILLIERS, 2-str., 2-speed .....	£27 10
1916 2½ h.p. IMPERIAL-J.A.P., 2-speed, kick-starter, accessories .....	£36 10
Walsonian C.B. Sidecar, to fit same, almost new .....	£10 0
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15K. .... (No offer, a bargain)	£45 0
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**MOTOR CYCLES FOR SALE.**

**Gamage.**

**GAMAGE**, 2½h.p., 1914, 3-speed, perfect condition, 120 to gallon; £17/10.—Fairview, Brooke Av., South Harrow. [X5089]

**Harley-Davidson.**

**HARLEY-DAVIDSON** Combination, 1915, all electric model, good condition; £65.—Mayes, Wireless School, Farnborough, Hants. [7594]

**COLMORE** Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802]

**HARLEY-DAVIDSON**, 7-9h.p., 3 speeds, combination, electric equipment, in nice condition throughout; £70.—Perry and Co., 337, Euston Rd., London. [7576]

**1916 Harley-Davidson** and Montgomery sidecar, lamps, horn, in very good condition; £86.—Elce and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [0552]

**1916 Harley-Davidson** and Sidecar for sale, Bosch mag., Palmer cord tyres, done about 8,000 miles; £85 or near offer.—Apply, Mr. Cook, 38, Blandford St., W.1. [7635]

**7-9h.p. Harley-Davidson**, 1916, with sidecar, £75; also a 1915 dynamo Harley combination; both machines going well. Wauchope's, 9, Shoe Lane, London, E.C. [7837]

**1917 Harley-Davidson**, olive, electric, De Luxe sidecar; cost £127 three months ago; same as new; £110, or close offer; seen any time.—David, 1, Riverside, Newbridge, Mon. [X5195]

**HARLEY-DAVIDSON**, 1915 Model 11F, and Scott's Westall coach sidecar to match, new tyres and chains; any trial; £65; consider fast solo part.—Deane, Matlock Bath, Derbyshire. [X5056]

**1915 7-9h.p. Harley** Combination, scarcely used, 1917 condition throughout, fully equipped, handsome outfit, tyres unsratched; best offer over £75.—5, The Parade, Belmont, Surrey. [7801]

**1915 7-9h.p. Harley-Davidson** and genuine H.D. sidecar, 11F, lamps, mirror, mechanical horn, speedometer, new tyres, mileage under 1,500, new May, 1916, perfect running order; £65.—Cooper, 3, King's Rd., Windsor. [7605]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Late 1915 T.T. Harley, 7-9h.p., 3-speed, clutch, kick start, just overhauled, fitted new tyres, and enamelled latest 1917 olive green colour, disc wheels, 65 gns. (D) [7917]

**HARLEY-DAVIDSONS** Actually on Show.—1917 magneto model, with C.H.D. bulbous sidecar, £150; also 1916 magneto model, Swan sidecar, T.T. bars, hood, and accessories, £89/10; two 1915 magneto models, with nice coach sidecars to match, £72/10 and £75 each; trial with pleasure; exchanges; E.P. by arrangement.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7712]

**Hazlewood.**

**5-6h.p. Hazlewood-Jap**, 1915, 3-speed, clutch, kick start, perfect condition throughout, Lucas accessories, Klaxon; £46.—Summerton, South Lawn, Burford, Oxon. [7703]

**HAZLEWOOD** 1915 Combination, 5-6h.p. J.A.P. engine, 3-speed clutch, and kick starter, Lucas lamps, speedometer, special sidecar; £72/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5186]

**Henderson.**

**HENDERSON** Combination, 4-cyl., Bosch mag., tyres like new, lamps and spares, etc., Swan de Luxe coachbuilt sidecar, whole outfit in splendid condition, and nearly new; £80; any trial.—101, Tooting Bec Rd., Tooting, S.W. [7644]

**Hobart.**

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1915 Hobart, 2-speed, 2-stroke; 22 gns. (D) [7919]

**HOBART**, 1917 model, 2½h.p. Villiers, 2-stroke, 2-speed, in first-class condition; £32.—Henshaw, Chemist, Shrewsbury. [X5065]

**HOBART** Combination, late 1915, 6h.p. J.A.P. engine, Sturkey-Archer 3-speed countershaft gear, Bosch mag., F.R.S. Major lamp, horn, 650x75 tyres, all necessary tools and spares, been carefully driven about 100 miles; cost over £95, accept 65 gns.; will give 100 miles free trial to prospective purchaser, whole outfit guaranteed equal to new.—Rodman, Membury, Rampart Rd., Bitterne Manor, Southampton. [X5038]

**Humber.**

**HUMBER** Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

**1914 3½h.p. 3-speed Humber**, lamp, etc.; £35, cash or easy terms.—R. E. Jones (Oranges), Ltd., Swansea. [0863]

**HUMBER**, 1912, 3½h.p., 2 speeds, spring forks, in good condition; £24.—Motor Exchange, Horton St., Halifax. [7648]

**3h.p. Humber Motor Cycle**, Bosch, B. and B., tyres new, chain drive; £15; photo 6d.—Webb, 2, Sylvan Rd., Forest Gate, E.7. [7691]

**3½h.p. Humber**, 2-speed Roc, new tyres, splendid condition, Cancellet sidecar; £22; will sell separately if required.—Walmisley, Wivelsley. [X5087]

**HUMBER**, 3½h.p., 1914, 3 speeds and clutch, lamps, horn, and sidecar; £38; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [X5029]



## MOTOR CYCLES FOR SALE.

## Humber.

FOR Sale, 3½ h.p. Humber, 1913, 2-speed, handle start, speedometer, lamps, in good order; £25.—Meeks, 55, Dalling Rd., Hammersmith. [7310]

1914-15 Humber, water-cooled, 3½ h.p., 3-speed, lamps, horn, in very good condition; £30.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492]

3½ h.p. Humber, 2-speed, and free, electric lamps, C.B. 2 sidecar, wind screen, unpunctured, 90 m.p.g. last week; £30.—Wood, 16, Haslemere Av., West Ealing. [X5091]

HUMBER, 3½ h.p., 1911, 2 speeds and clutch, and sidecar; £30; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7828]

1914 3½ h.p. 3-speed Humber, all accessories, electric light, excellent condition; £40, or near offer.—Lee and Son, 178, New King's Rd., Fulham, S.W. [X5039]

## Indian.

1915 Indian, 5 h.p., 3-speed, Lucas lamps and horn; £45.—Below. [0803]

1915 Indian, 3½ h.p., 3-speed, twin, T.T. bars, lamps, horn; £40.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491]

7-9 h.p. 1915 Indian, T.T. clutch model; £32.—Sellers, The Motor Cycle Specialist, Dorchester. [7875]

1912 4 h.p. Blue Indian, 2 speeds, free engine; £22/10. Motor Exchange, Horton St., Halifax. [7649]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 T.T. Indian, clutch; 39 gns. (D). [7920]

INDIAN 1915 Coach Combination, electric lighting, 7-9 h.p.; £60.—51, Maplethorpe Rd., Thornton Heath. [7779]

INDIAN, 1914, 7-9 h.p., and coachbuilt sidecar, low mileage, fast, powerful; £35.—66, Honley Rd., Catford, S.E.6. [7800]

INDIAN, 1916, 6 h.p., 3-speed, kick start, clutch, in perfect running order, and good condition; £47/10.—W. Crumplin, Odham, Hants. [7123]

1914 7-9 h.p. Indian Combination, 2-speed, electric model; £40, or nearest offer.—Harris, 1, Clovelly Rd., Acton Lane, Chiswick, W. [7690]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 Indian, 2-stroke, 3-speed, clutch, kick-start; 37 gns. (D). [7930]

7-9 h.p. Indian Combination, 1914, very fast, not done 8,000 miles; any trial; £57/10.—The Purley Motor Garage, Ltd., Purley. Tel.: Purley 103. [7333]

INDIAN 1915 5-6 h.p. Combination, 3 speeds, speedometer, in real nice condition throughout; £60.—Percy and Co., 337, Easton Rd., London. [7575]

1916 7-9 h.p. Powerplus Indian, 3-speed, hand and foot control clutch, fast and powerful; 58 gns.—Sellers, The Motor Cycle Specialist, Dorchester. [7872]

LATE 1914 7-9 h.p. Indian Combination, little used, last 13 months, lamp, horn, speedometer, etc., perfect condition; £40.—C. Bennett, 8, Terry St., Dudley. [X5004]

INDIAN, 1914 T.T. Model, clutch, mag., recently overhauled, tyres nearly new, in good running order; £40, or nearest.—Snowdon, Plainville, Pool, Leeds. [7587]

7-9 h.p. Indian and Sidecar, 1914, 2-speed, kick start, nearly new condition, spare tyre, lamps, horn, tools, etc., just overhauled; £60.—Box L4,484, c/o The Motor Cycle. [7941]

INDIAN, 1916, 7-9 h.p., 3-speed combination, new condition, electrically equipped, hood and screen; £63; quantity of petrol.—Seen any time at 41, Brighton Rd., Croydon. [7674]

1914 Indian and coachbuilt sidecar, 7-9 h.p., 2-speed, spring frame, kick start, in excellent condition; £45.—Write appointment, Carruthers, 48, Avenue Rd., Southend-on-Sea. [7869]

INDIAN 1916 5-6 h.p. Combination, 3 speeds, 1917 Phoenix coachbuilt sidecar, used on Sundays only, in splendid condition; £72.—Apply, 358, Wandsworth Rd., Clapham, S.W. [7793]

INDIAN, 1914, 7-9 h.p., 2-speed, spring frame, electric lights, speedometer, 2 new Dunlop tyres, in excellent condition; £40.—O. Grossmith, 94, Lincoln Rd., Walton, Peterborough. [X5070]

7-9 h.p. Indian Combination, 1914, spring frame, fitted with handsome De Luxe sidecar, and all accessories; £47/10; any severe trial allowed.—Wanchope's, 9, Shoe Lane, London. [7838]

INDIAN 1914 7-9 h.p. Combination, clutch, 2-speed, kick start, spring frame, recently had £10 overhaul; £45; call between 2 and 5 p.m.—Bennett, 58b, Crawford St., Marylebone, W. [7734]

1914 (late) Indian Combination, 2 speeds, clutch, spring frame, speedometer, electric equipment, special 2-seated sidecar, first-class condition; £55.—Hayden, 69, Cambridge Rd., Kilburn, N.W. [7851]

INDIAN, 1916, 5 h.p., 3 speeds, hand and foot clutch, electric lamps, kick starter, cylinders just been taken down, splendid condition.—Write, Lieut. Beeby, 40, St. Charles's Sq., N. Kensington, London. [7664]

INDIAN, 1915-16, 5 h.p., 3 speeds, kick starter, Corbin-Brown speedometer, P.H. lamps, mechanical horn, Phoenix sidecar, hood, screen, clock, quantity of spares, enamel and plating perfect; £58.—184, Plumstead Common Rd., Woolwich, S.E. [X4887]

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ATTENTION,  
AND PERFECTION.

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NEW No Slip. More Power, Less Petrol, No Fastener Required

SPECIAL TRIAL OFFER:

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## MOTOR CYCLES FOR SALE.

## Indian.

7-9 h.p. Powerplus Indian, 1916 model, fitted with handsome De Luxe sidecar, electric equipment, spring frame, smart in appearance, and mechanically sound; £85.—Wanchope's, 9, Shoe Lane, London. [7834]

## Ivy.

IVY 2-stroke, 1915, 2½ h.p., 2-speed, not done 1,200; £20, no offers.—257, Oxford Rd., Reading. [X5133]

IVY, 2-stroke, 2½ h.p., 1915, good tyres, fully equipped, as new throughout; £23.—Advertiser, 156, Gt. Portland St., W.1. [3924]

IVY, 2½ h.p., 2-stroke, single speed, excellent condition throughout; £25/5; exchange or extended payments.—Service Co., 292, High Holborn, London. [X5172]

## James.

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803]

1916 James Single, excellent condition, privately owned; bargain, £50.—Williams, Deceive, Eythorne, Dover. [X5024]

JAMES, 2½ h.p., 1915, 2-stroke, 2 speeds; £31; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7811]

JAMES, 2½ h.p., 1916, 2-stroke, 2 speeds, lamps, and horn; £56; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7812]

JAMES 1914 3-speed Coach Combination, finish navy blue, accessories; £45.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7716]

1913 James Combination, waterproof Bosch, chain drive, countershaft 2-speed gear, coach-built body; £35/10.—Motor Exchange, Horton St., Halifax. [7650]

JAMES 4½ h.p. 1914 Combination (coachbuilt), 3-speed countershaft gear, speedometer, and horn; £44; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7810]

JAMES 1913 4½ h.p. 3-speed Combination, standard specification, exceptional condition throughout, fullest equipment of accessories, spares, and tools; £45.—4a, Rosendale Rd., West Dulwich, S.E.21. [X5026]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—New 1917 James, 4½ h.p., 3-speed model, in stock, £69/10; also de luxe James combination, 1917, with Lucas dynamo lighting, 79 gns.; also standard 1916 James combination, fine order, 69 gns. (D). [7921]

## J.H.

J.H., 2-speed, new; £35/14; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5182]

J.H., 1917, new, 2½ h.p., 2-speed, 2-stroke; 42 gns.—W and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7629]

## Kerry.

KERRY, 2½ h.p., mag., Grado gear, new tyre; £11/15.—I, Ebner St., Wandsworth. [7944]

## King Dick.

1914 King Dick, 4 h.p., fitted for paraffin, fixed engine; £25, or offers; 4 gallons petrol free.—Green, 45, Glenhorne Rd., London, E.17. [X5092]

## Levis.

LEVIS, 1915, 5 h.p., mag., lamps, almost new; 25 gns.—I, Ebner St., Wandsworth. [7945]

1916 Levis, equal new, perfect condition; accept £21.—179, Brixton Rd., S.W.9. [7681]

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804]

LEVIS 1916 Popular Model, not more than 300 miles, fine condition; £22.—J.B., 17, Woodland Villas, South Chingford. [7859]

LEVIS, 1915, Bosch mag., perfect condition; a real bargain, £17; apply after 8 o'clock.—37, Herman Rd., Old Kent Rd., S.E. [7618]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 Levis Popular, 22 gns.; 1915 2½ h.p. Levis, 2-speed, 26 gns.—(D). [7432]

LEVIS, 2½ h.p., 1915, 2-stroke, head lamp, generator, rear lamp, good tyres, fully equipped; bargain, £24.—Advertiser, 156, Gt. Portland St., W. [6609]

LEVIS, 2½ h.p., electrically equipped, new tyres, mechanical horn, Bosch, Amac, as new; any trial; £24; after 6—98, Addison Gardens, W.14. [X5093]

1917 Levis, 2½ h.p., new condition, mileage under 300, head lamp, horn, tyres unpunctured; £25/10.—Fulljames, Briarvil, Queen's Grove, Southsea. [X5052]

LEVIS, 1915, 2½ h.p., 100 m.p.g., lamps, horn, tools, etc., condition as new; £22.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [7863]

LEVIS, 2½ h.p., 1917, latest model E, Enfield 2-speed, chain drive, brand new, in stock; £47/10.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7322]

LEVIS, 1915, 2½ h.p., 2-stroke, new heavy Dunlops, new belt, mechanically perfect, lamps, horn, and all accessories, with 5 gallons petrol; 19 gns.—25, Chapel Hill, Crayford, Kent. [X5022]

LEVIS, 2½ h.p., No. 1 Model, 2-speed, chain-cum-belt drive, rubber studded tyres, brand new, in stock for immediate delivery; reduced price £44.—Mebes and Mebes, 156, Gt. Portland St., W.1. [7564]



# MOTOR CYCLES FOR SALE.

## Levis.

**L**EVIS. No. 1. 2½h.p., 1916, 26in. wheels, F.R.S. lamp, Glorifone, knee-grips, T.T. Douglas bars, mileage 800, carefully used, 6 gallons spirit; £32.—Rayner, 9, Spondon Rd., Tottenham. [7787]

**L**EVIS 1916 Popular Model, very little used, semi T.T. bars, accessories, £27/10; also a Baby Model, in fine condition; £23/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7718]

## Lincoln-Elk.

**L**INCOLN-ELK, 2½h.p., excellent condition, £16; bucket seat, 7/6.—Leo Beeden, 12, Coronation St., Darfield, near Barnsley. [X4884]

**R**IDER TROWARD and Co., 31 and 78, High St., Hampstead.—Lincoln-Elk, 1913, 3½h.p., variable gear, good order; 19 gns. (D) [7436]

## Matchless.

**M**ATCHLESS, 8h.p. twin J.A.P., overhead, in real good order and condition; £30.

**M**ATCHLESS, 5-6h.p. twin J.A.P. free engine; £26.—Percy and Co., 337, Euston Rd., London. [7577]

**M**ATCHLESS Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881]

**M**ATCHLESS Combination, 1915, 7h.p. M.A.G. engine, 3-speed, screen, lamps, luggage carrier, tools, etc.; 70 gns., no offers.—106, Albion Rd., Teddington. [X5060]

**M**ATCHLESS 1915 Combination, 8B, mag., 2 large lamp sets, electric horn, speedometer, splendid condition; bargain, £75.—21, Glenashaw Mansions, Brixton, S.W. [7861]

**M**ATCHLESS, 1914, 8h.p. J.A.P., 2-speed combination, kick start, lamps, all new tyres; 45 gns., or near offer.—H. Collins, 51, Tregarvon Rd., North Side, Clapham Common, S.W.11. [7693]

**M**ATCHLESS, late 1915, 7h.p. M.A.G., coachbuilt sidecar, just repainted black, and gold line, as per sunbeam, all accessories; £85.—Cass's Motor Mart, 5, Warren St., Euston Rd., W.1. Museum 623. [6821]

**M**ATCHLESS 1917 Combination, 8h.p., 3-speed, clutch, and kick starter, detachable wheels, including spare wheel, new; £120; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5183]

**19**17 8h.p. Matchless Combination (delivered July), spurs tube, chains, valve, and piston rings, fitted with speedometer and horn, not run 200 miles, guaranteed perfect condition; £112/10.—Box L4,464, c/o The Motor Cycle. [7607]

**M**ATCHLESS 8h.p. 1917 Combination, belonging to officer ordered away, only run 200 miles, absolutely as new, in use one week, Smith speedometer, hood, and wind screen.—On view at Messrs. H. Collier and Sons, Ltd., 44, Plumstead Rd., Plumstead, S.E. [7876]

**M**ATCHLESS—Actually on show, the latest 1917 War Model issued by Collier's 8h.p. J.A.P. engine, 3-speed, kick starter, spare wheel, luxurious sidecar, £120; also 1914 8h.p. J.A.P. combination, 45; exchanges; E.P.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [7721]

## Minerva.

**M**INERVA, 3½h.p., C.A.V. mag., spring forks; £8; drive away.—10, Lisford St., Sumner Rd., Peckham. [7619]

**M**INERVA, 2h.p., mag., good running order, new tyres and belt; £10.—Berk, 28, Westfield Rd., Hornsey. [7902]

**3**2h.p. Minerva Combination, H.T. mag., in perfect running order; £14/10.—22, Church Lane, Battersea Square. [7782]

**A**LL Chain-Drive Lightweight Minerva, P. and M. 2-speed, run on paraffin; any trial; £12.—163, St. Alban's Av., Bedford Park, Chiswick. [7806]

## Motosacoche.

**£**7.—Motosacoche lightweight, mag., Whittle, good Dunlops, spring forks, enamel perfect, in tip-top condition.—Webster, Warwick Rd., Kenilworth. [X5190]

## New Hudson.

**N**EW Hudson 6h.p. Twin, 1914, 3-speed, coach sidecar; £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7627]

**2**3h.p. New Hudson-Jap, 1914, 3 speeds, clutch, excellent condition; £23.—Halliwell, Whitegate, Edgworth, near Bolton. [X5145]

**N**EW Hudson, 2½h.p. J.A.P. mag., 3 speeds; gift, £16/16.—Wandsworth Motor Exchange, Eber St., Wandsworth (Town Station). [7946]

**L**ATE 1916 New Hudson, 2½h.p., 2-stroke, lamps, accessories, little used; bargain, £24, or nearest offer.—105, London Rd., Calne, Wilts. [7866]

**19**14 New Hudson, 2½h.p., 3-speed, clutch, just overhauled, perfect condition, looks new; bargain, £29. Midwood, 32, R.F.C. Villas, Lynchford Rd., Barnborough, Hants. [7783]

**N**EW Hudson 1914 Twin, 6h.p., 3-speed combination, with adjustable wind screen, coverall apron, 2 lamps, spare belt, complete valve, chain, in very nice order; bargain, no offers, £48.—148, Newmarket St., Grimsby. [X5005]



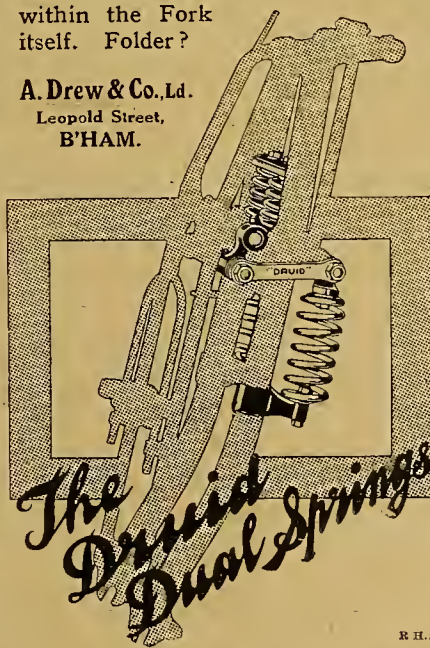
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your rides?

If not—then they all obviously lack the sense of utter confidence it imparts, and the perfect Spring Fork responsible for its presence, namely—The

# DRUID MARK II

This Fork alone ensures perfect handle-bar comfort because The DRUID Dual Springs it embodies alone entirely neutralize all vertical and horizontal shocks within the Fork itself. Folder?

A. Drew & Co., Ltd.  
Leopold Street,  
B'HAM.



The  
Druid  
Dual Springs

# MOTOR CYCLES FOR SALE.

## New Hudson.

**N**EW Hudson, 1913, 3½h.p., 3-speed, clutch, in good running order; £34/15; exchange or extended payments.—Service Co., 292, High Holborn, London. [X5170]

**19**15-16 New Hudson, War Office Model, 4h.p. combination, 3-speed, clutch, and kick starter, splendid condition, all accessories; price £55.—Frank Hobson, 72, Chapel Hill, Huddersfield. [X5124]

**N**EW Hudson, 2½h.p., 1914 excellent condition, 3-speed, clutch, kick starter, Bosch mag., new Dunlop tyres, head lamp and generator, and accessories; £39.—Johnson, Bakery, Pulham Market, Norfolk. [7634]

## New Imperial.

**N**EW Imperial, 1917, 2½h.p., 3½h.p., 6h.p. models, in stock.—Crow Bros., Guildford. [2563]

**C**OLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805]

**I**MPERIAL-J.A.P., 1914, 2½h.p., 2 speeds, good condition.—S. G. Misselbrook, Gomshall, near Guildford. [X5104]

**N**EW Imperial, 2½h.p., 2-speed, fitted 1917 engine improvements, overhauled; any trial; £25.—Meeten, Dorking. [7740]

**N**EW Imperial-Jap, 2-speed, clutch, kick start, like new; £40.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7622]

**N**EW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0839]

**N**EW Imperial, 1916, 2-speed model, in nice, sound condition, mechanically sound as new; £32/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [7832]

**19**15 J.A.P. New Imperial, 2-speed gear, gate change, spotless condition, sound and reliable; £28, or near offer.—J. Lindfield, 93, High St., Crawley, Sussex. [7707]

**N**EW Imperial-Jap, 1915, 2-speed, splendid condition; £27/10, no offers; seen by appointment.—G. 45, Victoria Rd., Upper Tollington Park, Finsbury Park, N.4. [7879]

**N**EW Imperial-Jap, 2½h.p., 1916, 2 speeds, lamps, horn, and speedometer; £35; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7822]

**N**EW Imperial-Jap, 2½h.p., 1916, 2-speed, T.T. Model, lamps, horn, and speedometer; £35; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7821]

**2**3h.p. New Imperial-Jap, T.T. August, 1916, mileage 1,841, Lucas lamps, speedometer, horn, accessories, etc., perfect throughout; £33.—Box L4,472, c/o The Motor Cycle. [7612]

**N**EW Imperials, 1917 models, for immediate delivery, No. 1 33 gns. No. 2 45 gns.; two new 1916 models, No. 1 at £38.—Colmore Depots, 211, Deansgate, and 31, Renshaw St., Liverpool. [0886]

**N**EW Imperial (new), 2½h.p., 2-speed; £40/19; actually in stock for immediate delivery; extended payments arranged.—Harrods Motor Showrooms, 118 Brompton Rd., London, S.W.1. [7892]

## Norton.

**R**IDER TROWARD and Co., 31 and 78, High St., Hampstead.—Norton, 1915, T.T., Philipson; 32 gns. (D) [7438]

**T**.T. Norton, October, 1916, run 800 miles, special engine, knee-grips, new cover, tube, and belt, does 109 m.p.g.; £50, or offer.—J. Goodenough, Cobham Lodge, Cobham, Surrey. [X5007]

## N.S.U.

**N**.S.U., 1914, 3h.p. twin, Bosch, 2-speed, spring frame; what offers?—Bensted, Iwade, Sittingbourne. [7641]

**N**.S.U. 4h.p. Twin Combination, 2-speed gear, splendid condition, fast; £16, bargain; appointment.—24, Camden Rd., N.W. [7807]

**2**3h.p. N.S.U., front and back sprung, Grando gear, 24 speedometer, good tyres, over 80 to gallon; £14.—H. S. Yaker, 7, Elizabeth St., Victoria. [7706]

**H**AVING Acquired the entire Stock in Trade of the N.S.U. Motor Co., Ltd., we can now supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Eagles and Co., Acton Hill Works, Acton, W.3. [X5095]

**N**.S.U. Countershaft 3-speed, 7h.p., 1915 model, m.o.v., spring frame, low position, 26x3 tyres, very fine and powerful machine, fitted with roomy and comfortable coachbuilt sidecar, most luxurious outfit; £65; part exchange lower powered machine.—A. Holland, Clarendon St., Coventry. [X5192]

## O.K.

**O**.K. Juniors—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn. [0910]

**R**IDER TROWARD and Co., 31 and 78, High St., Hampstead.—O.K. Junior 1915, good order, 16 gns. (D) [7922]

**O**.K. Junior, Mark IV., standard, new; 38 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5180]

## P. and M.

**P**. and M., 1914, sidecar, mileage under 2,000, new condition; £63.—Petch, Bridge Mills, Savile Town, Dewsbury. [X5127]



## MOTOR CYCLES FOR SALE.

## P. and M.

P. and M., 1913, 3½ h.p., engine thoroughly overhauled by makers August, 1917, coachbuilt sidecar, re-enamelled, in perfect condition; £40.—George Wood, Langley, Heanor. [X5107]

P. and M., 1912, 2 speeds, good running condition, accessories, petrol, and 10 gallons good substitute given; all for £35; sidecar £4 extra.—Write, Box 1,213, c/o The Motor Cycle. [X5054]

## Portland.

1913 7.9 h.p. Portland C.B. Combination, Peugeot engine, Bosch, B. and B., 2-speed (new), extra heavy Dunlops, splendid condition; £32, no offers; seen evenings.—19, Wilcox Rd., South Lambeth, London S.W.8. [7684]

## Precision.

PRECISION, 4½ h.p., little used; bargain, £35.—Ewart, 25, Queen's Rd., Aston, Birmingham. [X5084]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 Precision, 4 h.p., clutch, enclosed Bosch; 17 gns. (D) [7923]

1913 4 h.p. Precision, wicker sidecar, Grado gear, Bosch, lamp, horn, tools, etc.; a bargain, £28.—7, Denton St., Barnoldswick, Yorks. [X5129]

PRECISION 1914 4 h.p. Twin C.B. Combination, 3 speeds, clutch, kick start, gears and engine recently overhauled; £35.—175, Stockwell Rd., Brixton. [7848]

## Premier.

PREMIER, 1913, 3-speed, clutch, kick starter, fine condition; £28/10.—Eagles and Co., High St., Acton, W.3. [X5099]

PREMIER, 1915, 3½ h.p., 3-speed countershaft, kick, coach sidecar, lamp, speedometer; £42.—Newell, Laurels, East Malling, Kent. [7732]

PREMIER, 1914, 3½ h.p., Armstrong 3-speed, Montgomery coachbuilt sidecar, good condition; £38.—Short, Elm Cottage, Great Warley, Essex. [7737]

PREMIER, 3½ h.p., 1913, countershaft 2-speed gear, chain-cum-belt drive, and coachbuilt sidecar; £38; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7830]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 Premier, 7.9 h.p., 3-speed, 30 gn. coach sidecar, 59 gns.; 1915 3½ h.p. Premier coach combination, 48 gns. (D) [7924]

7.9 h.p. 2-speed Countershaft Premier and coachbuilt sidecar, with luggage carrier, 1915, splendid running order, done 3,000 miles only; owner enlisted; £56, no offers; cost over £100.—44, Burton Rd., Melton Mowbray. [X5101]

## Quadrant.

QUADRANT, 4½ h.p., 1916, 3-speed countershaft, all chain, kick start, coach sidecar; £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7626]

QUADRANT, 3½ h.p., 1911, automatic B. and B. carburettor, spring forks, fitted for substitute; £10.—C. Leggat, 40, Thorlow St., Wandsworth Rd., Clapham, S.W.8. [7740]

## Radco.

RADCO, 2-stroke, 1915, thorough running order, fast, reliable; £14.—Clark, 13, Spencer Terrace, Sunbury, Middlesex. [7885]

## Revere.

REVERE-VILLIERS, 2-stroke, 2-speed and neutral, B. Thomson-Bennett variable msg., P. and H. set, Best and Lloyd, Dunlop tyres and belt, under 1,000, perfect and unscratched; £32.—Davis, Avenue Rd., St. Neots, Hunts. [X5062]

## Rex.

23 h.p. Rex, 3 speeds and free engine, Bosch msg.; £24/10.—Motor Exchange, Horton St., Halifax. [7613]

5.6 h.p. Rex, 2-speed, N.S.U. gear, wicker sidecar, just overhauled; £22.—Ronald W. Horsler, Sundon, Post Office, near Dunstable, Beds. [7614]

REX Combination, 6 h.p., 1913, coach sidecar, Roe 2-speed gear, in first-class condition; £40.—J.B., 17, Woodland Villa, South Chingford. [7856]

1914 6 h.p. 2-speed Rex, Canelet coachbuilt sidecar, perfect, fast, powerful; exceptional bargain; trial here; £32/10.—Howe, High St., Nuneaton. [X5116]

REX 1910 6 h.p. Combination, free engine, in splendid order, little used; accept £18, or exchange lower power.—Searle, Pretoria Villa, Clister-on-Sa. [X5139]

32 h.p. 1912 Rex de Luxe, sidecar machine, low, excellent condition, owner incapacitated; £20; three times petrol given for cash.—Ayling, Manor Rd., Walton-on-Thames. [7683]

## Roach.

1912 3½ h.p. Silent Roach, Abingdon 2-speed gear, h.h.c. clutch, belt and chain; £24/10.—Motor Exchange, Horton St., Halifax. [7651]

## Rover.

1917 Rover, countershaft, new; immediate delivery.—Rover Depot, George St., Croydon. [X5010]

COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [6883]

1917 Rover, 3½ h.p., 3-speed countershaft model, run only 500 miles, complete lamps, horn, speedometer, tools; £70.—Batchelor, Clarence St., Kingston. [7766]

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1914 3½ h.p. 3-speed Rover, footboards, excellent condition; £38.—Parker and Son, St. Ives, Hunts. [7884]

1913 Rover, 3½ h.p., 3-speed, splendid condition, as powerful as when new, and sidecar; £36.—Ball, 72, Sydney St., Chelsea, S.W. [7673]

ROVER Motor Cycles, 1917 models from stock; £74/10: two only; first cheque secures.—Colmore Depot, 211, Deansgate, Manchester. [6887]

1914 Rover and wicker sidecar, 3½ h.p., clutch model, N.S.U. 2-speed, lamps, horn, etc.; £33 cash.—Hammond, 193, Ardgowan Rd., Catford, S.E.6. [7590]

ROVER Motor Cycle, 1917 models from stock, T.T. Philipson and 3-speed models; catalogues free.—Rider Troward and Co., 31 and 78, High St., Hampstead. [7925]

ROVER, 3½ h.p., late 1916, 3-speed countershaft, kick starter, head lamp, generator, rear lamp, very nice mount, perfect throughout; £60.—Mehebs, and Mehebs, Original Light Car Specialists, 154-6, Gt. Portland St., W.1. [7563]

## Royal Ruby.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—New 1917 Royal Ruby in stock; 4 h.p. J.A.P., Sturmerie countershaft gears, 69 gns. [7926]

HOT Stuff, 3½ h.p. Royal Ruby, built 1914 for I.O.M. T.T., o.h.v. twin J.A.P., 2-speed countershaft, clutch; £35, or exchange single.—Rae, Annickvale, Saltcoats. [7676]

## Rudge.

RUDGE, I.O.M. special, fast machine, almost new; £50.

RUDGE, N.S.U. 2 speeds, in nice condition; £23.—Percy and Co., 337, Euston Rd., London. [7574]

5.6 h.p. Rudge Multi, very powerful, very fine coach sidecar; £45.—Motor Exchange, Horton St., Halifax. [7654]

1917 I.O.M. Rudge, lamps, horn, as new; £70.—Elce and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [6481]

RUDGE Multi, 3½ h.p., 1914, first-class running order, just been overhauled by makers; £34.—J. Wilson, Toft Hill, Bishop Auckland. [X4881]

RUDGE Multi, 3½ h.p., 1916 model, lamps and horn; £42; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E. [7823]

RUDGE, 3½ h.p. T.T., 1912-13, Philipson pulley; owner killed in action; price £18, or exchange piana player.—Goodman, 35, Ranelagh Gardens, Barnes. [X5021]

1915 5.6 h.p. Rudge and Rudge sidecar, S.A. 3-speed hub, head lamp, horn, good tyres, new belt, not ridden all 1916, perfect condition, vaporiser, runs on paraffin; owner going abroad; £50.—Thubron's Garage, Redcar, Yorkshire. [X5143]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1917 Rudge Multi, 49 gns.; 1914 T.T. Rudge Multi, 27 gns.; 1913 Rudge Multi, 23 gns.; 1913 T.T. Rudge, clutch, 22 gns.; 1913 T.T. Rudge, Philipson, 22 gns.; 1912 Rudge, 2-speed, clutch, 18 gns. (D) [7425]

RUDGE Multi, 5 h.p., 1915, re-enamelled and plated, engine completely overhauled, new Lucas lamp set, horn, and mirror, electric s.e. lamp, tank green and gold, smart turnout, perfect; £57, or near offer.—H. Holloway, 16, Whitesands, Birmmies. [X4362]

RUDGE Multi, 1913, fitted for substitute, excellent condition, £35/5; Isle of Man engine model, fitted with large head lamp, and Klaxon mechanical horn, 1914 model, £30/10; Multi, in excellent condition, 1914, practically new tyres, T.T. hrs, £31; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5173]

## Scott.

COLMORE Depots, Birmingham, and Manchester, for Scott motor cycles. [6806]

32 h.p. Scott Motor Cycle, 1916, in exceptionally fine order.—Box 1,219, c/o The Motor Cycle. [X5109]

1913 Scott and Carburettor Underslung Sidecar, spares, etc., petrol given, fine condition; £29.—25, Church Path, Aston Green, Chiswick, W.4. [7748]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 Scott coach combination, fine order, 53 gns.; 1914 Scott, solo, 32 gns. (D) [7927]

SCOTT, 1914, and sidecar, 2-speed, kick starter, 2-cyl., 2-stroke, Binks carburettor, Stewart speedometer, Palmer cord tyres; £55; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5179]

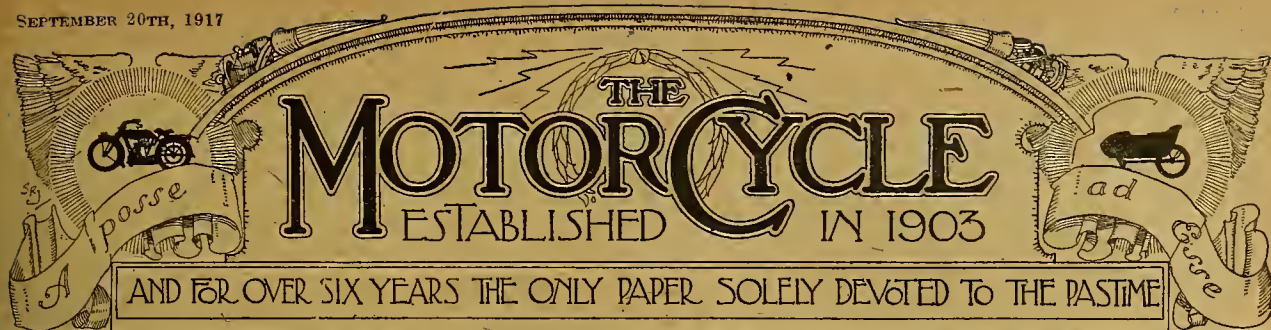
## Service.

SERVICE, 2½ h.p., 2-stroke Pece engine, chain and belt drive, 1915, a very reliable proposition, 2-speed, Harcourt extra cooling fins; £35; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5174]

## Singer.

24 h.p. T.T. Singer, 1914, completely renovated as new, all black, red lining, Bosch msg., Grado multi gear, special engine, new belt, new lamp, new horn, new footboards; exceptional bargain; best offer.—Box L4,478, c/o The Motor Cycle. [7897]





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**Road Conditions.**

**O**UR high roads, once the pride of the world, have suffered less than those of many countries from the ravages of war. Still, the great increase of motor transport by heavy vehicles carrying materials of war has caused the roads to suffer very much in certain parts.

The Road Board is temporarily suspended, and so is unable to help. Labour is an almost insuperable problem, and on this depends the actual mending of the roads and the cartage of roadmending material. It is, nevertheless, urgent that, in spite of the difficulties at present prevailing, the surfaces of the roads should be kept up to the highest possible standard.

To save money in the repair of roads is a false economy. A bad road, which has temporarily saved money to the county council responsible for its maintenance, calls for further expenditure on the part of the Government in maintaining the vehicles which are compelled to travel along it.

It is well known that at the Front special roads are being made to support the heavy military traffic, such as lorries, cars, motor bicycles, and guns, and distinguished road surveyors and road experts have been sent to France with a large supply of steam rollers to keep them in good condition. This has all told on the road conditions at home. The remedy, we venture to suggest, is to employ such labour as is procurable and can be obtained at the present time. There are now, thank goodness, a great many more German prisoners in this country than English prisoners in Germany. As we have urged on several occasions in this journal, why should not they furnish the labour for road maintenance? Also, the road specialists of our Army are the Royal Engineers. At the various fronts the Royal Engineers have to repair the roads. Why should not their training in England consist in attending to those portions of our main thoroughfares which are in need of

urgent attention? Having learnt their job in England, they could then proceed straight away to useful work behind the lines.

**The Military Lightweight.**

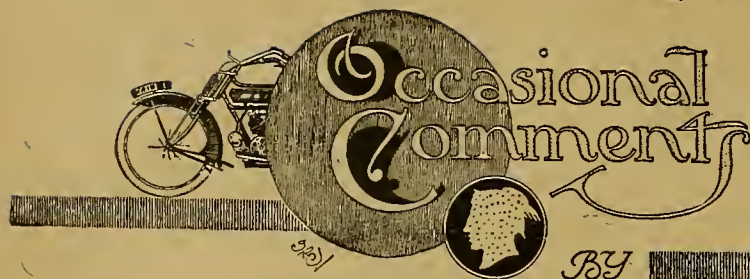
**T**HE controversy now current in our Correspondence columns anent the suitability of lightweight machines as compared with heavier and more powerful mounts for military use should serve more than one useful purpose. To attempt to compare a low-powered two-speed machine with a heavyweight three-speed for the mud-plugging conditions obtaining in the vicinity of the firing line is, as already pointed out by one or two correspondents, unfair, for here it is obvious that weight and high power are necessary; but it must be borne in mind that probably less than 50% of the motor cycles now used by the Army are operating under such conditions.

Many unfavourable things have been said regarding the lightweight by men most familiar with the really trying conditions of military motor cycling, forgetful of the fact that hundreds of machines are in use behind the lines, at home in England, and in other portions of the world where the conditions are nothing like so trying.

The Army requires two types of motor cycle—the big single, which is undeniably the despatch rider's mount in the vicinity of the fighting area, and the lightweight for more moderate use. The various features which render the latter unsuitable for the trying conditions of the fighting line are strongly in its favour when it comes to that wide sphere of usefulness outside the immediate shell-shattered area, and if the total sum of opinions be taken it is probable that all doubt will be removed as to whether there is a place for the lightweight as a military mount.

The main purpose served, therefore, by the correspondence now current should be to obtain some recognition of the fact that each type of machine has its undoubted sphere of usefulness and its proper place.





### Unfair.

**I** YIELD to no man in my admiration for the staunch Triumph, but I feel a little irritated with those D.R.'s who will persist in drawing invidious comparisons between it and the Douglas from a service standpoint. It is almost as bad as contrasting a Baby Lewis and an 8 h.p. Matchless from a sidecar standpoint; at any rate, it illustrates the same mental weakness, somewhat exaggerated, and I hope I should say the same if the Douglas did not happen to be fitted with one of my pet F.T. engines. I do not suppose that the War Office would ever have ordered light-weights for the war zones if (a) there had been any chance of their getting an adequate supply of heavy pluggers, or (b) if they had known what strenuous work the war was destined to lay on the D.R.'s. In actual fact, the War Office at very sudden notice was confronted with the need of many thousand machines, and, in the interests of store departments, they had to limit the machines to as few makers as possible. They had no choice. The Triumph and Douglas works alone could offer any immediate production on the necessary scale, and the little Douglas ought rather to be congratulated on the magnificent show it has made under conditions for which it was never designed, than to be criticised because in some respects it has had to give best to a heavier and a more substantial design altogether. Moreover, some of these critics talk as if one and the same machine were necessarily ideal for Flanders mud under war conditions, and England's quondam billiard table roads for pleasure work in peace, which betrays a further want of grasp and logic. After all, the Douglas has built up its name and sales in the teeth of the  $3\frac{1}{2}$  h.p. single, which was firmly established before the first Douglas was made. The fact is that some of the D.R.'s are so obsessed by war conditions—and small blame to them—that they have almost forgotten other conditions ever existed, and will exist again. The sturdy single-cylinder has unquestionably demonstrated its supremacy in the war zones, but it will have to fight almost for its very existence when the war is over, against a horde of big and little twins of all shapes and sizes, against the two-strokes, and perhaps against the four-cylinders. It had already ceased to dominate the market in 1914, and its war supremacy, as stated above, is largely an accident due to the exceptional conditions applying to its production and to its work.

### The Machine of To-morrow.

**I** HAVE just been chatting with one of the old brigade, whose last mount was a  $2\frac{3}{4}$  h.p. Excelsior, date about 1902, and who has been out of England for the last ten years or more. He was particularly struck with the extent to which the motor

bicycle has replaced the push bicycle for short-distance work. In his riding days an owner regarded a trip on his machine as something of an event. He spent odd bits of several days in readying the machine for the perilous journey. He attired himself in very special garments. The whole family came out to see him off, and the eyes of the women folk were a thought anxious, if they were not actually moist. During the preliminaries every household in the street disgorged itself into the road, and stared. When he reached his destination similar scenes were enacted. The machine was petted, rubbed down with silk handkerchiefs, and carefully locked up for the night, whilst the rider behaved like a subaltern who has come home to be invested with the Military Cross. Nowadays a man wheels his machine out into the road if he is not going further than the nearest post office. When he makes a call he props it up carelessly against the nearest wall or kerb. He never talks about it except to call it evil names, unless, indeed, he gets amongst the boys, when he forgets his misdoings and inefficiencies, and lies about it shamelessly. The motor cycle has almost ceased to be a sporting possession: it is, even in wartime, a national convenience, like the drainage, and we only remember its existence when it gets out of order. As I look out of my window, I see a dozen of all sorts and sizes, dirty, forgotten by their owners, propped up against any old thing, until such time as their riders shall think of making a move.

### The Utility Motor Bicycle.

**O**F course, my colonial acquaintance was prone to exaggerate the degree to which this subtle and gradual change has been carried, though he is perfectly accurate as to its nature. The transformation is not yet complete, and we have still a long way to go before motor cycling sinks—or rises—to the level of dull utility, as the push bicycle has already almost completely sunk—or risen. (Some of our readers will remember the shy reverence with which every small boy in North London recognised the badges which a few crack cyclists used to wear: to-day, few men know these badges, and if you happen to know what they stand for, you take no interest in them.) But this change is more than a matter of observation; it will exert, and is already exerting, a most profound influence on design. The kind of atmosphere which you find at Wisley Hut or at the Blue Bird at Brooklands, or at the Sefton Hotel in Douglas during a T.T. week, once dominated the entire world of motor cycling. To-day it is becoming the monopoly of a few freaks, and the next generation will all but cease to recognise any connection between sport and motor cycling. I do not mean that racing and trials will necessarily cease, or that motor cycle touring as a hobby will become extinct. I do mean



## Occasional Comments.—

that motor cycles will be increasingly bought for their usefulness, and decreasingly bought for pure pleasure.

## What They Will Become.

IT is absurd to suppose that the design of motor cycles will become wholly stereotyped by the pressure of this development. Just as we shall always need several sizes and types of aeroplanes, so we shall always maintain a certain variety in motor cycles. One man will want to take his wife and baby with him at week-ends in a sidecar. Another will tour the Highlands in all weathers for business purposes. A third will want to scorch from Folkestone to Leicester every Saturday to see his girl: and so forth. But the vast majority of buyers will purchase a motor cycle for short distance work. They will want something light, handy, economical, reliable, clean, and comfortable. They will turn up their noses at machines weighing two or three hundredweight, and equipped with three or four gears, and a lot of electrical frills. The sort of machine on which the American factories have hitherto specialised will not interest them in the very slightest degree. What they would really like would be a machine as handy as, say, a Baby Levis: only it must be able to climb ordinary main road hills: it must have a simpler and cleaner lighting system than a gas lamp: it must not bump too perceptibly: it must have an entirely reliable transmission: and it must be reasonably free from such petty irritations as four-stroking and sooted plugs. It will be cheap to buy: handy to bang about: and very inexpensive to run.

## Our Opportunity.

GREAT Britain has a unique opportunity in this field. America cannot build up a big home market for such machines until her road system is infinitely more developed. Our Colonies are in the same case. The big Continental nations have already allowed us to steal a long start, and their designs will be more influenced by road gradients than ours are. We have a unique chance to develop the lightweight utility mount, first for our own sakes, as we shall be ready for it years before other nations are, and secondly for export, as by lapse of time the complex

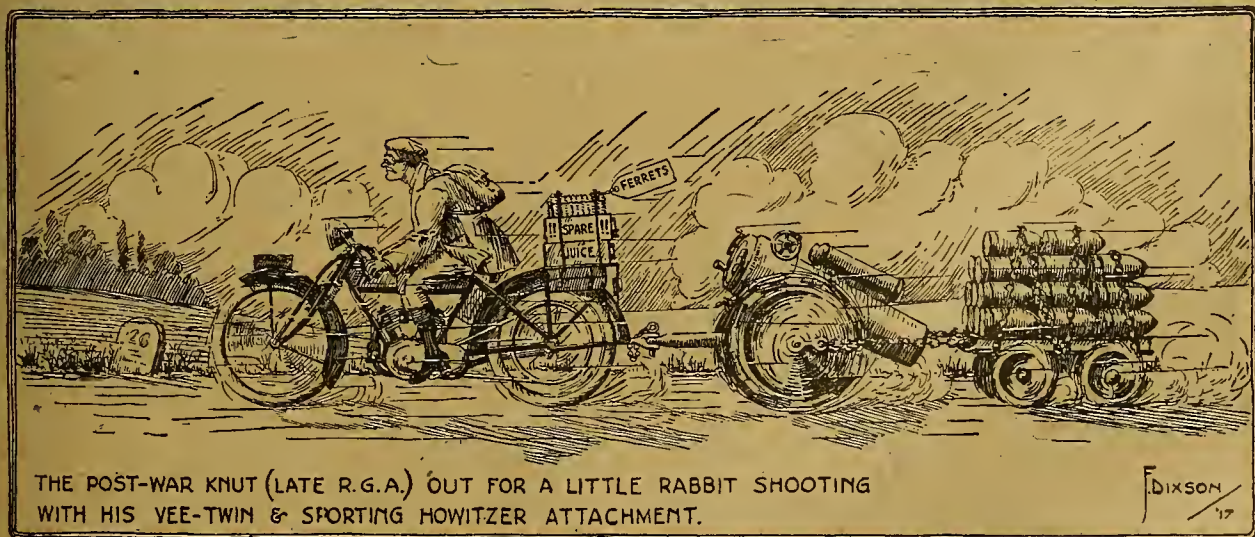
heavyweight will go out of fashion in other countries also. We are still very far short of the ideal in almost every respect. That is natural and pardonable, but it will be unpardonable if our trade wastes too many years following the heavyweight will of the wisp; its knell is already sounding, so far as the general public are concerned, though our dashing youngsters will buttress up an illusive demand for it for some years to come.

## My Inconsistency.

I ADMIT that I still ride heavyweights. I like a biggish engine, a spring frame, an absurd three or four-speed countershaft gear weighing about half a ton, an electrical lighting outfit, and other frills. I buy and use all these things, because I have yet to strike the lightweight which is good enough. But make no mistake. If I could get a decent lightweight—fast, reliable, comfortable, and electrically lit—to-morrow, nobody would ever see me on a 3½ h.p. again. At present I am most content with a couple of mounts: something big and heavy for the long distance rides and the hilly counties; something with two strokes and a single gear at about 110 lb. instead of a push bicycle. Some day one and the same machine will more or less serve both purposes, and then the sporting youngsters only will buy engines of 3½ h.p. and over.

## The Motor Cycling Girl.

ON similar grounds I cannot regard the girl rider of to-day as typical of her successor in the next generation. In the old days a few girls took up cycling strenuously. They rode races, they made records, and they accompanied men on long distance tours. But they were always a despicable minority of their sex, numerically speaking. There are now millions of girl riders. A few of them cycle "to see the country," but the majority use their machines exclusively for short distance convenience work. The modern motor cycling girl is a sportswoman, pure and simple, in most cases; she rides out of bravado, or for pure love of it. Such girls will never be very numerous. But offer the girls a light, clean, handy motor cycle to ride to business or tennis or golf, and they will nearly all buy it, if they can afford it.



THE POST-WAR KNUT (LATE R.G.A.) OUT FOR A LITTLE RABBIT SHOOTING WITH HIS VEE-TWIN & SPORTING HOWITZER ATTACHMENT.

DIXON  
17



## A WAR-TIME OVERHAUL.

**PART II.**—In the issue for Sept. 6th a comprehensive article appeared on the overhauling of the engine, brakes, and wheels. In this article the repainting of motor cycle and thorough overhauling of sidecar body and upholstery are described.

**H**AVING taken note of the repairs and ordered all spare parts, the next step was the preparation for the painting and enamelling of the machine. All repairs to frame, mudguards, and fittings should be finished before any painting is done.

That being the case, the frame, etc., previously cleaned, is rubbed down with coarse sandpaper and wiped over with a cloth. Two good coats of priming colour consisting of white lead and turpentine are applied with sufficient lamp black to give it a lead colour.

The careful straining of both paint and enamel is most necessary if a good surface is desired. I made a practice of straining every time I used it, and poured out sufficient only for the work in hand, any overplus being again strained and returned to bulk. Care should be taken in obtaining fine flat brushes.

The painting was done in batches, about three days being allowed between each coat, the surface being rubbed down with fine glass paper after each application. The inside of the mudguard had five or six very thick coatings, special attention being given to the beadings. When the final priming coat had been applied the whole was well rubbed down with wet pumice powder on a felt pad (the latter being a piece of thick carpet felt tacked on a strip of wood). Needless to say, the felt should be turned over and tacked on the back. Careful and even rubbing will give a surface like satin, and when finished should be sponged over and wiped with a damp leather.

### Enamelling.

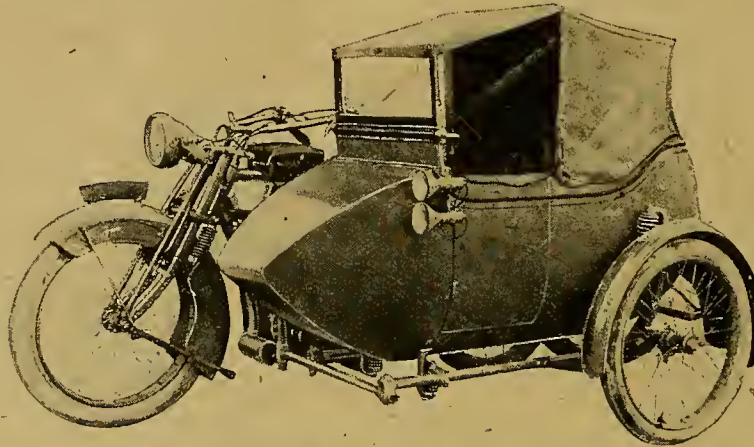
The enamel used had a basis of Robiallac, but as the colour desired could not be obtained from the makers of this preparation two other shades of oil enamels were used and mixed with it until the desired colour was obtained. It is advisable when mixing a special colour to have sufficient, as it is difficult to match up exactly if one happens to run short. It was estimated that about one and a half pints would be ample, but, to be on the safe side, two pints were mixed up and kept tightly stoppered.

In putting on the enamel there is a happy medium to be arrived at. It must not be too thin or the resulting surface suffers, and it certainly must not be too thick or it will "run" badly.

Enamelling is best done on a quiet (preferably wet) day. If windy a surface like sandpaper will be the

result. Arrangements must also be previously made for the disposal of the various parts as they are finished. Nails on the walls will take the smaller ones, and wire hooks in the ceiling are useful for the frame, which is difficult to handle when wet.

I overcame this by doing only half the frame at a time which left the other half dry for handling. When there is plenty to do this does not cause any great delay.



The Clyno sidecar, showing the compact hood, which the writer made himself.

Absolute cleanliness of the work, paint, brushes, etc., is essential, and the brushes should be washed out with clean turps every time they are used, and either left in the latter or wiped with a cloth and put where they cannot collect dust, etc.

When all the paintwork is finished and nicely hardened off, if all the defective parts are repaired and new parts have arrived

the assembling can be commenced. The engine should have first attention, and, if it has been dismantled, the greatest care taken with the erection, especially with the setting of the flywheels. Neglect will certainly result in trouble later, bad running and vibration ensuing if the flywheels are not dead true.

In erecting the machine it is far more convenient to work on the bench. Inaccessible places can be more easily reached and much back-aching saved. It is an easy matter to obtain the assistance of a friend or two to help lift it down when completed.

The first unit to be placed in position should be the engine. This should be done before the forks are attached to the frame. It is then only a matter of fitting the frame to the engine, and not having to lift the engine into the frame. After this is in and well bolted up the forks can be attached. Then, if the front and back stands are put on, the machine will stand up.

A tin of grease or vaseline should be on the bench, and if every bolt, screw, and nut be well greased before it is inserted, this will facilitate removal at some distant date and at the same time prevent rusting up.

It is well to remember the order of assembly, as it is annoying to find later on that it is necessary to remove certain parts already built up in order to place in position some portion previously forgotten. Each part should be completed before another is commenced, all nuts and bolts being made secure. Failure to do this means the possible loss on the road or derangement of some adjustment.



**A War-time Overhaul.—**

**The Sidecar.**

This was in rather bad condition, having had four or five years' hard wear. It may be suggested that it would have been better to sell this for what it would fetch and purchase a new one, but the clean lines of the design, the springing, the high sides; which give protection and comfort to the passenger, and general satisfaction during the whole time, made me very reluctant to part with it.

A general overhaul was decided on, which included the following: Repainting, reupholstering, and making new hood complete with framework.

**Repainting.**

The old paintwork of the body had cracked and chipped off, and in some places the bare wood was exposed. In addition it could be observed that the three-ply wood which formed the body was cracked and was opening. To get anything like a surface these cracks would have to be filled in such a way as to prevent their opening in the near future. Consequently the whole paintwork had to be cleaned off.

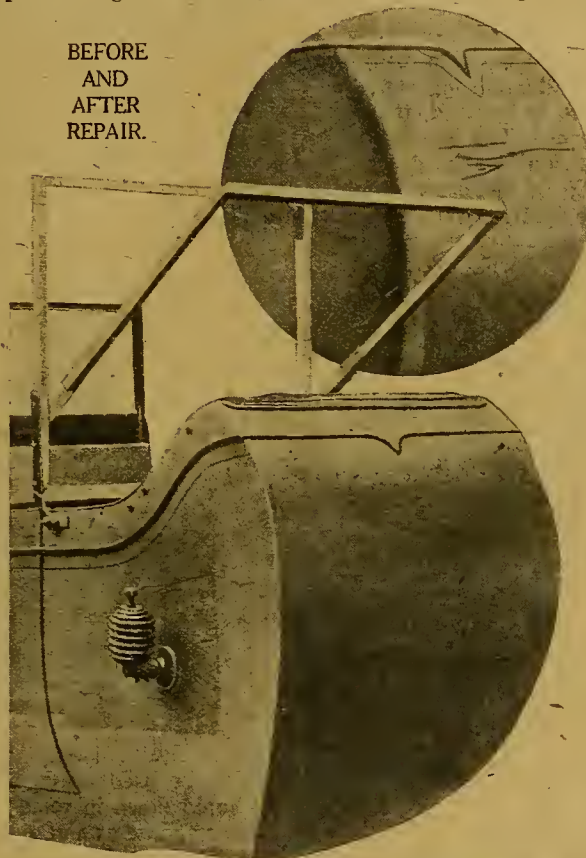
The only way to remove it was by burning, and an Imp blow-lamp was utilised for that purpose. The damage to the three-ply woodwork was then exposed and means taken to repair it.

The curved back of the sidecar had one bad crack extending for about 14 in., with several smaller ones running almost parallel. These had been caused by the edge of the accumulator box carried on a shelf inside breaking loose during a journey and chafing and bulging the back, doing damage both inside and out.

To make a sound repair it was considered advisable to pack the inside with a strip of wood 1 ft. 6 in. long and 3 in. wide, rounded off to the same curve as the back. This was to be permanently glued and screwed inside. To secure perfect contact whilst the glue was setting a similar piece of wood was shaped to fit the outside. Before applying the glue holes were drilled in the outer clamping piece and the back, screws being inserted and screwed up tightly to the inner piece. When well drawn together they were taken out and preparations made for gluing up.

Good warm glue, fairly thin, free from grit or dirt, is well worked into the cracks, the latter can be opened with a penknife for the purpose. The inner clamping piece and the inside of the sidecar are also liberally coated and the whole again well screwed up.

BEFORE  
AND  
AFTER  
REPAIR.



It will be seen from the lower picture that the renovation was successfully carried out. Note also the simple construction of the framework of the hood.

It is important to note that the outer clamp, which is only used temporarily, must be coated thickly with some grease to prevent the excess of glue which will be squeezed out of the cracks making it adhere to the sidecar back. A sheet of oiled or greased paper inserted between the two will answer the same purpose.

When this is done leave the work undisturbed for twelve hours or longer, and then the screws can be removed, together with the outer clamping piece. The holes in the three-ply can be slightly countersunk and brass screws, of similar thickness but shorter, can be inserted, taking care that the heads are sunk slightly below the surface.

A few fine pins or screws will generally suffice to fasten any loose portion of the woodwork, especially if hot glue is run in beforehand. The whole body must be well rubbed down with glass paper, finishing with a finer grade, and after being dusted a thick coat of priming can be applied. It is preferable to purchase this rather than mix it oneself, and there are several good preparations on the market that can be obtained from any large oil and colour merchant. A 2 lb. tin of coachpainters' priming costs from 1s. to 1s. 3d. It will dry in about six hours, and from three to five coats put on at intervals of a day will assure a good body and foundation for the finishing coats.

After each coating is dry rub down with glass paper as before. When it is thought sufficient body has been applied a final rubbing down is to be given. On this entirely depends the quality of the surface and finish that

will be obtained eventually. After finishing with a fine grade paper the surface should be smooth all over, without any projections or rough places. A final application of pumice powder and water gives a very smooth finish. The finishing coats of enamel should be applied with a day or two's interval, rubbing down with pumice after each. If it is intended to do any lining or panelling, it should be done now, after which a coat of the best carriage varnish will complete the paint work.

**The Hood.**

The majority of hoods fitted to sidecars are of a very ugly and clumsy design, and there is therefore great room for improvement. Usually when not in use they project in an unsightly manner anything from 6 in. to a foot behind the sidecar body, spoiling the appearance and being liable to damage. To avoid

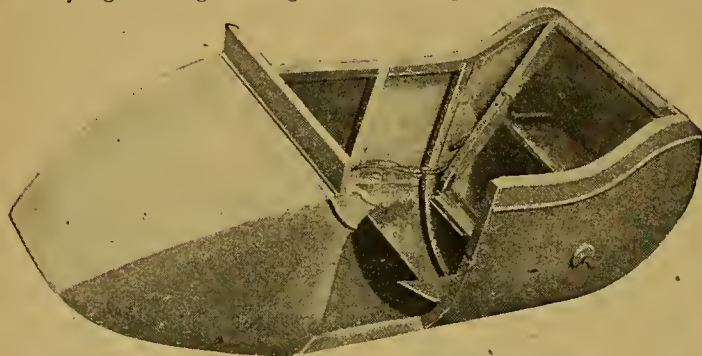


**A War-time Overhaul.—**

these objections the present framework was constructed, and, though it may not be approved of by the professional hood maker, it meets all the requirements from the motor cyclist's point of view. The chief features are: Easily put up and down (about thirty seconds), no straps, no projection behind, folds up into small and compact space, no bent wood framework, and can be constructed at a cost of under 15s. including waterproof material.

**Making the Frame for Hood.**

The framework consists of six pieces of ash, mahogany, or oak,  $\frac{1}{2}$ in. thick,  $\frac{3}{4}$ in. wide. Four angle-pieces are made of brass strip  $\frac{3}{4}$ in. wide drilled for screw holes. The height and width will, of course, depend on the body to which it is to be fixed, therefore definite figures cannot be given. The illustration will convey a very good impression of the design. The frame of the screen is made of mahogany, and is very light though strong. The front portion of the



(Left) Sidecar body stripped of upholstery, the exterior having been prepared with several "priming" coats.

(Right) The amateur's attempt at upholstering appears to have been quite a success.



hood is attached to the top of the screen by three turn buttons, and the hinges which carry the screen are sufficiently strong to withstand the strain of the hood without any supporting straps.

To make the hood, all that is necessary is to fix the framework and screen on to the body, securing the former in its place by strong string or cord which follows the line the cloth should take, extending from the screen over the framework to the back.

Patterns can be cut the full size of the hood in brown paper. It consists of three pieces only, the top and back being one, with two side wings which, of course, should be exactly the same. These are machined together, leaving wide hems all round the outside double stitched for strengthening purposes. A number of press buttons are inserted to secure it to the body, and if carefully made the structure should last many years.

**The Upholstery.**

Possibly few would care to tackle this portion of the work, and it might be advisable to obtain the services of a working upholsterer to do it, as if not carefully done not only will it quickly come to pieces, but the good appearance of the sidecar will not be enhanced by defective covering or stuffing.

At the same time there is nothing particularly difficult to prevent an amateur doing the work. It is

impossible to give definite instructions as to how to proceed, as there are so many models of sidecar bodies that details of work on one would be totally wrong for another. A few general hints can, however, be given. To start with, all the old covering should be removed bodily with the stuffing, taking care not to tear or damage it for reasons that will afterwards be given. To do this remove the tacks at one end, using a medium size screwdriver to prise them out, working all round each piece. All old tacks should be drawn and not broken off or driven into the woodwork. The wool stuffing should be removed, and if in good condition it should be well picked over and placed aside for later use.

**Fixing Padding and Springs.**

The old covering and lining should now be parted, all the stitching and machine work unpicked. These are now valuable as patterns for the new coverings, which should be cut out to size and marked up with thick pencil so that the work to be done with the sewing machine will be facilitated.

When the new covering is finished the wool or hair stuffing can be replaced, working it into inaccessible places with a stick, but taking

care to get it evenly distributed. The springs can usually be used again, but may have to be refixed or anchored down in some way. Of course there will be many small items and much detail work that will require attention, but if careful work is combined with determination, the satisfaction of having carried out the overhaul without professional assistance and the considerable saving in cost will well repay the trouble and labour involved.

**"FITS" OF FLOODING.**

A READER challenges my statement that "top feed" carburettors are immune from flooding due to the vibration of riding. Well, I speak rather from experience than from theory, and I have yet to meet a case of vibration flooding with a top feed vaporiser. He rather gives his case away by admitting that his machine has "fits" of flooding, which cover its stationary periods as well as its motion; and adds that it cures itself, though no sign of dirt can be found on the needle surfaces. I fancy his trouble is dirt on the valve surfaces, despite his denial, and advise him to make a very precise examination when the next "fit" occurs.

IXION.



# THE Critic

## Fireside Chats on Motor Cycle Problems

### Is the Quick-detachable Sidecar Worth While?

"WHAT," said the Novice, "do you consider is the best type of double-purpose mount for a man like myself? My big twin uses too much petrol, and I am thinking of getting a light jigger, which I can ride solo in comfort, attaching the sidecar only when I want it."

"Don't! For goodness sake, don't!" implored the D.R., with real sincerity. "You will never find that the scheme works satisfactorily."

"Why not?" queried the Novice, with that slight tone of injury which suggested the crushing of a pet theme. "Scores of men do it, so why shouldn't I?"

The D.R. looked him up and down. "To begin with, you are a fair old weight to stick on a machine attached to a sidecar relying on the ordinary sort of quick-detachable-joint," he observed. "Secondly, you would find the whole shoot required realigning every time you stuck it on."

"That's all piffle," observed the Manufacturer, with his usual abruptness. "As the Novice says, most riders of modern 3½ h.p. machines have sidecars they can attach when they want to—even the speed man, like yourself."

"I know that," answered the D.R. "It is a state of affairs I have often cursed. Four years ago the average 3½ h.p. was a decently light sort of a 'bus you could ride solo with pleasure; then everyone took to hitching a sidecar to it, with the result that the weight of the machine went up and up, and now the so-called 3½ h.p. double-purpose mount is neither one thing nor the other. It is not a decent sidecar mount; it is too heavy for solo. It is heavier, as a rule, than the 7-9 h.p. T.T. Indian!"

#### -A Useful Featherweight.

The Manufacturer growled and proceeded to plaster the chewed end of his cigar into shape.

"Look here," the D.R. went on, waving his forefinger. "You, if anyone, ought to be glad to support the distinction between the solo and the sidecar machine. What happens to your solo mounts to-day? Shoddy sidecars, with shoddy couplings, are shoved on to them. They are ridden out of alignment, simply because the average quick-detachable joint is a hopeless proposition as regards rigidity, and frame breakage and goodness knows what not results. I think that the quick-detachable sidecar—particularly the featherweight variety—has been a thorn in the flesh of the Manufacturer for three years past."

"Because people won't trouble to get them decently fixed up in the first

place," observed the Journalist. "I've used a featherweight in conjunction with my 3 h.p. V. twin for four years. I hitch it on every Saturday to carry the parcels-home. It is an after breakfast job. It never gives me any trouble."

#### Cheapness and Rigidity.

The D.R. stared at him. "Vastly different from my experience," he answered. "Your machine is a small twin, with no great reserve of power, which accounts for it. Now if your sidecar had been attached to a big thumping single, it would have knocked all the guts out of the couplings in a fortnight." [Our apologies for the D.R.—Ed.] "You would have found that every time you came to put the thing on it had sprung the least little bit. If, after barking your knuckles and crumpling your collar, you finally got it in place, you would have found it out of alignment; and at the end of a twenty-mile journey it would have been out of line again."

"I agree," said the Journalist, "that rapid acceleration tests the strength of sidecar couplings more than anything."

"Not only rapid acceleration," corrected the D.R., "but irregularities of torque. I guarantee that sidecar couplings would hold up better on a 10 h.p. four-cylinder Henderson than on an average 3½ h.p. single."

No one had much to say to this. The Manufacturer stared gloomily at the Discharged Soldier. "How do you drink soup?" he finally asked.

"Through a straw," came the answer. "I expect you use a sponge!"

"Yes, through a straw!" repeated the maker of shells. "And I expect you attempt to attach your sidecar with a pocket spanner. If you took the trouble to see that every connection was tightly home to the very last thread, you would not have so much trouble with your alignment."

"Look here," said the D.R., "let's be sensible. You know as well as I do that the couplings of an ordinary quick attachment sidecar are not up to the work when the machine has any kick about it. If you want the thing to be safe and to retain its alignment, you have to make a fourth point of attachment, and all sorts of things, and when you have finished it is no longer a quick detachable affair; neither is it a featherweight. Is not that so?"

The Manufacturer sucked hard at his cigar. "If you mean the cheap featherweight sidecar, I agree absolutely," he answered. "As a matter of fact, an efficient featherweight, which will stand

up to its work, would be just as expensive to make as a heavyweight—in fact, more so, as only the very best material would permit the necessary combination of lightness and strength. Moreover, if it is to be light, it must be scientifically designed, so if you are alluding to the really cheap featherweight, made in some back cellar in Birmingham or Manchester or Singapore, I agree with you absolutely. This class of goods—like all cheap stuff—of course gives trouble."

"But I don't want a cellar-made article," put in the Novice, who had said little hitherto, but for whose benefit the discussion was wrought. "Neither do I want a rickshaw from Singapore. What I want is a 3½ h.p. machine, with a sidecar of the Montgomery, Mills-Fulford, or Gloria order. And what I want to know is—will such an outfit give me satisfaction for quick attachment and detachment?"

"No," said the D.R.

"Yes," replied the Manufacturer. They glared at each other.

#### A Semi-permanent Attachment.

"I think it will," supplemented the Journalist. "But it will probably be more trouble to attach and detach than you think. A sidecar is such an unmechanical proposition that attachment must be on very secure and correct lines if it is to hold. It does not make up well as a quick attachable affair. In that I agree with the D.R. If a sidecar is to hold good under all strains it must be more or less of a permanent fixture, drawn home by force of bolt and stay. It is very difficult to arrive at permanency and quick attachability—unless the design of the sidecar throughout, particularly the couplings, be of a very high order. One cannot make a cheap sidecar which is efficient and quickly detachable. One is a job for the cellars of Birmingham, the other a task which requires the brains of such experts in straight tube design as Alfred Scott. I think that the Novice should decide to buy a good machine and a good sidecar, and to regard the outfit as a unit—except when, occasionally, he feels like a solo spin."

In submitting to the Editor articles, photographs, or drawings, contributors are asked to mention whether the illustrations are exclusive, and further to enclose a stamped addressed envelope for return of unaccepted contributions.



# Automatic Carburation on a W.D. Triumph.

## THE EVEREST CARBURETTER FOR USE AT THE FRONT.

**N**OWADAYS, when the trend of opinion is towards simplicity of control and the elimination from our handle-bars of superfluous levers, perhaps the following notes on the results obtained with an automatic carburetter may be of interest.

The carburetter is an Everest, lent me by the courtesy of a prominent motor cycle manufacturer, and my machine is a 1916 W.D. 4 h.p. Triumph counter-shaft model.

As the construction of this carburetter differs considerably from what we regard as standard practice, I shall attempt to explain its unconventional features.

The instrument I used had a bottom feed float chamber of standard type, though I believe this has been changed in the later models to top feed—to my mind a retrograde step.

Externally the vaporising chamber does not differ materially in appearance from the Amac or B. and B. type, but internally is found a radical departure from standard. The central vaporising tube—one cannot call it the jet, because it has, really eight jet orifices on it—arises from the base of the vaporising chamber. The jet orifices are arranged in a vertical line on the aspect of the tube nearest the inlet pipe.

On this jet tube, and working in direct conjunction with the throttle slide, there is a sliding spring damper which controls the number of jets in operation from none to eight. The design of the throttle slide is also unique. It is cylindrical in shape, except for the cutting away of the external lower aspect to provide a wide range of adjustment for the main air intake.

On the cutting of this "main air curve," as I have dubbed it, depends entirely the automaticity of the instrument. The slide is a well-ground fit in the barrel, and, in addition to its normal up and down movement, the slide can be given a rotation through about 45°.

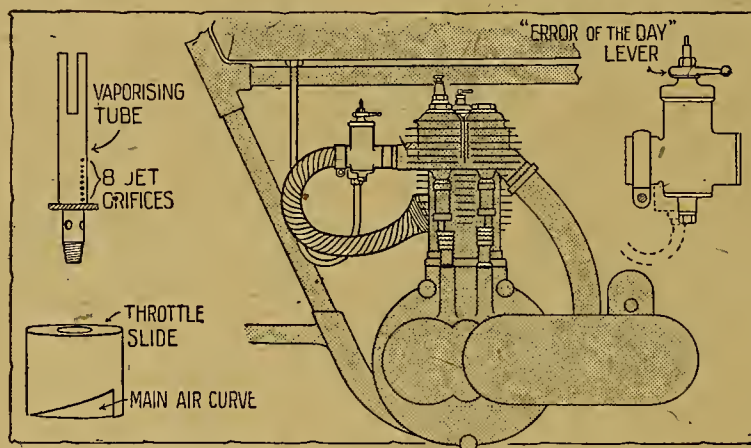
The purpose of this rotary movement, which is controlled by a small lever on the top of the carburetter, is to vary the "main air curve" of the throttle slide or, to put it in other words, this lever controls within a wide range the "quality" of the mixture supplied to the engine. Perhaps environment has assisted me in suggesting as a suitable name for this lever "the error of the day" lever.

After fitting the carburetter, I made a hot air intake with some flexible metallic tubing and fitted this also; as a result all the air in the carburetter was warm air

from the cylinder flanges. The entire instrument and hot air intake were then carefully lagged, and after a few adjustments and alterations the carburetter was given a prolonged testing during the first six months of this year. As the weather in this period was mixed—Arctic cold, heavy rain, and midsummer heat in turn—the testing may be said to be fairly comprehensive as regards temperature and atmospheric variations.

To get the best results this carburetter requires careful setting, but once set for any one engine the results it gives are excellent. When first fitted I could not cure an intolerable eight-stroking at all speeds below 15 m.p.h., so that it became obvious that the "air curves" did not suit this particular 85 × 97 (550 c.c.) engine, though formerly it had functioned very well on an 82 × 120 (633 c.c.) single doing similar work.

I altered this curve little by little until I got a carburetter setting that gave an absolute automaticity. A tick over in neutral, a dead slow crawl, and uniformly good acceleration to a maximum road speed of about 45 m.p.h. were obtainable by the movement of the single lever on the handle-bar. The "error of the day" lever setting varied within small limits; cold weather naturally demanded less



The hot air intake fitted to the W.D. Triumph and fittings of the Everest carburetter, of which the writer of the article speaks.

main air, warm weather the reverse.

The setting was only varied when the weather changed. I believe some interesting data could be obtained from investigations with this carburetter undertaken in conjunction with daily barometer and thermometer readings, but this I fear would not tend towards simplicity.

### Ease of Control.

For controllability in traffic this carburetter has no equal amongst the many I have tried, and after a year's active service motor cycling over different parts of the Western Front I plump unhesitatingly for ease of control as the most desirable feature in an active service mount.

When threading one's way between a stream of motor transport, and stream of mules or horse transport, the knowledge that a sudden call for the use of the h.b.c. clutch need not produce a noisy racing engine—a dangerous event when in the proximity of an Army mule's heels—adds considerably to one's driving confidence and comfort.

Petrol consumption averaged roughly from 55 m.p.g. to 70 m.p.g., depending on the nature of the runs.



**Automatic Carburation on a W.D. Triumph.—**

Going across a grass field or open country to an isolated battery position on bottom or second gear is not conducive to a good petrol consumption, hence the lower of the two average figures.

On the debit side, I found that this carburetter never gave as easy a start from cold with the kick-starter as the standard single jet type of instrument. Once the engine was warm, kick-starting was about as good with the one type as the other. I attributed this starting difficulty to the position of the jet orifices relative to the induced starting current of cold air. As the central vaporising tube is circular in section with the spraying orifices on the lee side, it seemed to me that the rush of air could not pick up its quota

of atomised petrol as easily as in the conventional single jet, where the air rushes directly across the jet opening. I wondered whether a contour, more nearly approaching a streamline of the vaporising tube, would have effected an improvement in starting from cold, but did not feel justified in attempting the alteration.

As it is, this automatic carburetter has been a great surprise to me, and it has added very materially to my comfort and pleasure on very many uncomfortable runs during the last six months. I have been unable to try it on other types of machines, but I should imagine that, given careful adjustment, it would be the carburetter for a two-stroke engine.

ALEXANDER LINDSAY, Capt., R.A.M.C.

## The Home of the Military Lightweight.

Describing a Recent Visit to the Douglas Works.

THE motor cycle public, or what is left of it, may be inclined to think that the Douglas productions, having reached a satisfactory point of development at the outbreak of war, are now merely standardised repetition work carried out to War Office demands. Whilst this is true in so far as the present W.D. Douglas is still the 1913 model, yet the up-to-date Douglas is a much improved article, and "after the war" models will cause some surprises when the details are made public.

During a recent visit to the Bristol works, Mr. S. L. Bailey (of record-breaking fame) showed us much that would interest our readers, but we are not at liberty to divulge the details.

There can be no harm in hinting at the clever development of the spring frame model, however, also the improvements in the details of the 4 h.p. model, and the new model of higher power than any previous Douglas. This latter machine will embody some striking

departures from the usual Douglas design. Several experimental models have been in constant use for the last eighteen months.

### An Up-to-date Factory.

The works at Kingswood, Bristol, are very interesting, and convey an impression of roomy cleanliness not always evident in a motor factory.

Many branches of war work were in hand, from the standard D.R. 2¾ h.p. machines to the stationary power units which are in use on the many war fronts.

It is interesting to note that the firm do their own forging and casting, also that bench tests are carried out by means of coal gas. A considerable amount of work is being done in the repair and rebuilding of war-wrecked machines; the transformation of a mud-grimed "2¾" suffering from shell shock to the, apparently, new model, ready for return to active service, is remarkable.

## Petrol and the Cancellation of Licences.

THE Automobile Association, on the 16th August, suggested to H.M. Treasury that motor vehicle owners whose petrol licences had been cancelled since July 1st, should be entitled to a refund of their 1917 Inland Revenue vehicle licences, in respect of the period during which they will not be able to use their cars and motor cycles.

Following is the reply received to the "A.A." proposal:

Treasury Chambers.  
10th September, 1917.

Sir,—I have laid before the Lords Commissioners of His Majesty's Treasury your letter of the 16th ult. asking that motorists who have not surrendered their motor car licences before 1st July last may now be allowed to do so and obtain refund of licence duty, in view of the cancellation by the Petrol Controller of unexpired petrol licences of the first and second issues.

In reply, I am to state that, in view of the express limitation of date specified in S.9 of the Finance Act, 1917, of which ample notice was given beforehand, my Lords have no power to accede to this request.

My Lords are informed by the Board of Trade that the petrol licences of the first issue were due for expiry at the end of October, 1916, and those of the second issue at the

end of April, 1917, and were only allowed as a special concession to remain in force until the end of July, 1917, beyond which date it was not considered justifiable to extend them.

Their Lordships are also informed that, with a view to meeting any special cases of hardship resulting from his action, the Petrol Controller has agreed to issue current motor spirit licences in exchange for unexpired out-of-date ones, where he is satisfied that the holders have used their allowances sparingly and solely for business purposes, and that motor spirit is still essential for such purposes.

I am, sir,

Your obedient servant,

T. L. HEATH.

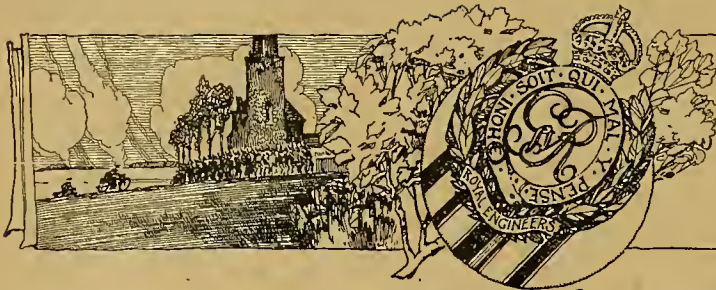
The Secretary,

Automobile Association and Motor Union,  
Whitcomb Street, W.C.2.

With reference to the last paragraph of the above letter, the Petrol Controller (on August 18th) gave the Automobile Association the following assurance.

"I am to say that the Controller is willing to accept your suggestion that the Automobile Association should be permitted to submit any such cases to him for consideration on their merits, with a view to the issue of fresh licences. No undertaking can be given that new licences will be issued in every case, and only those should be forwarded where there is satisfactory evidence that the petrol is really essential for business purposes."





## MILITARY NOTES.

### LIEUTENANT S. BROWNE, A.S.C., M.T.

MANY of our readers will remember S. Browne, one-time rider of Lurquin-Coudert and numerous other motor cycles. His most recent mount, prior to the one on which he is

be accounted for; also all repairs are entered into the 'repairs book,' which every motor cycle carries, and the name of the artificer and materials used. This is overlooked by the M.S. Sgt., and signed by the officer in charge. Every machine is sent out in order. May I suggest that the D.R.'s and artificers, efficient as they are, do not run the dépôts and workshops?"

and the first balloted men left with the —th reinforcements. It is anticipated that the first division (single men) will be exhausted by October, and arrangements are now being made for the calling up of the second division."

### DANGER AND THE A.S.C., M.T.

J. W. PEARSON evidently is of the opinion of the majority of infantry men when speaking of the respective dangers to which the various units are exposed: "Perhaps you will pardon me for writing, but I got rather a shock when I read the correspondence of F. T. Denton (*re* motor cyclists in the Army) about the fearful shrapnel. Possibly my friend is suffering from shock when he talks of shrapnel music, and invites Mr. Editor to share the terrible danger to which he is exposed. Mr. Editor, I am safe at home as I write this (please do not laugh), but I have been out for fourteen months in the trenches, and am no more use as a fighting man, and can honestly say that I never saw one of the A.S.C., M.T., near the lines, and what a difference between their pay and ours! When the M.T. have dumped their load, the horse transport takes it nearer the lines, and then the soldiers have to be their own transport, and, if there is an attack, then the fighting men carry the small shells to the guns."

### NOTES FROM NEW ZEALAND.

WE have received an interesting letter from Q.M.S. E. J. S. Lewton, Christchurch, who has from time to time contributed New Zealand motor cycling news to this paper. He is on final leave now, after having had a complete military training. Speaking of motoring in New Zealand, he says: "It is very much the same as usual, but competitions and trials are non-existent. British machines are very hard to get, worse luck. I have not yet seen a 1916 or 1917 Triumph, and I have come across only a few 1915 models. The same may be said of other British machines. It is very hard for patriotic riders to see their country 'over-run' with American motor cycles, but I suppose it cannot be helped. Let us hope for better days in the near future. There are not very many young fellows about these days, as nearly all have enlisted and left these shores. Conscription came into force here last December,

Lt. S. Browne, A.S.C., M.T., who, before the war, was one of the principals of the Rom Tyre and Rubber Co., Ltd.

depicted in the accompanying illustration, was a James, on which he rode in several important reliability trials. Before the war Lt. Browne was one of the principal partners of the Rom Tyre and Rubber Co., Ltd. He succeeded in getting a commission in the A.S.C., M.T., and had an adventurous voyage to the East, having come into closer contact with the blue Mediterranean than he intended on his departure.

### D.R.'s AND THEIR WORK.

A LIEUTENANT, signing himself "O.C. Taxicabs," takes exception to certain statements in the articles, "D.R.'s and their Work," in the following letter:

"I may be excused, as the Workshop Officer for the — Division, for saying a few things with reference to the above. The writer has some idea of how inspections, repairs, and supervision are carried out. Each motor cycle that comes into the workshop is not treated in any way like 'D.R.' points out. Each nut, bolt, tyre, and screw has to



Despatch riders with their Douglasses resting at the end of their journey. An official photograph taken in the midst of ruins near the trenches in the district of Messines ridge.





# ARIEL SERVICE.

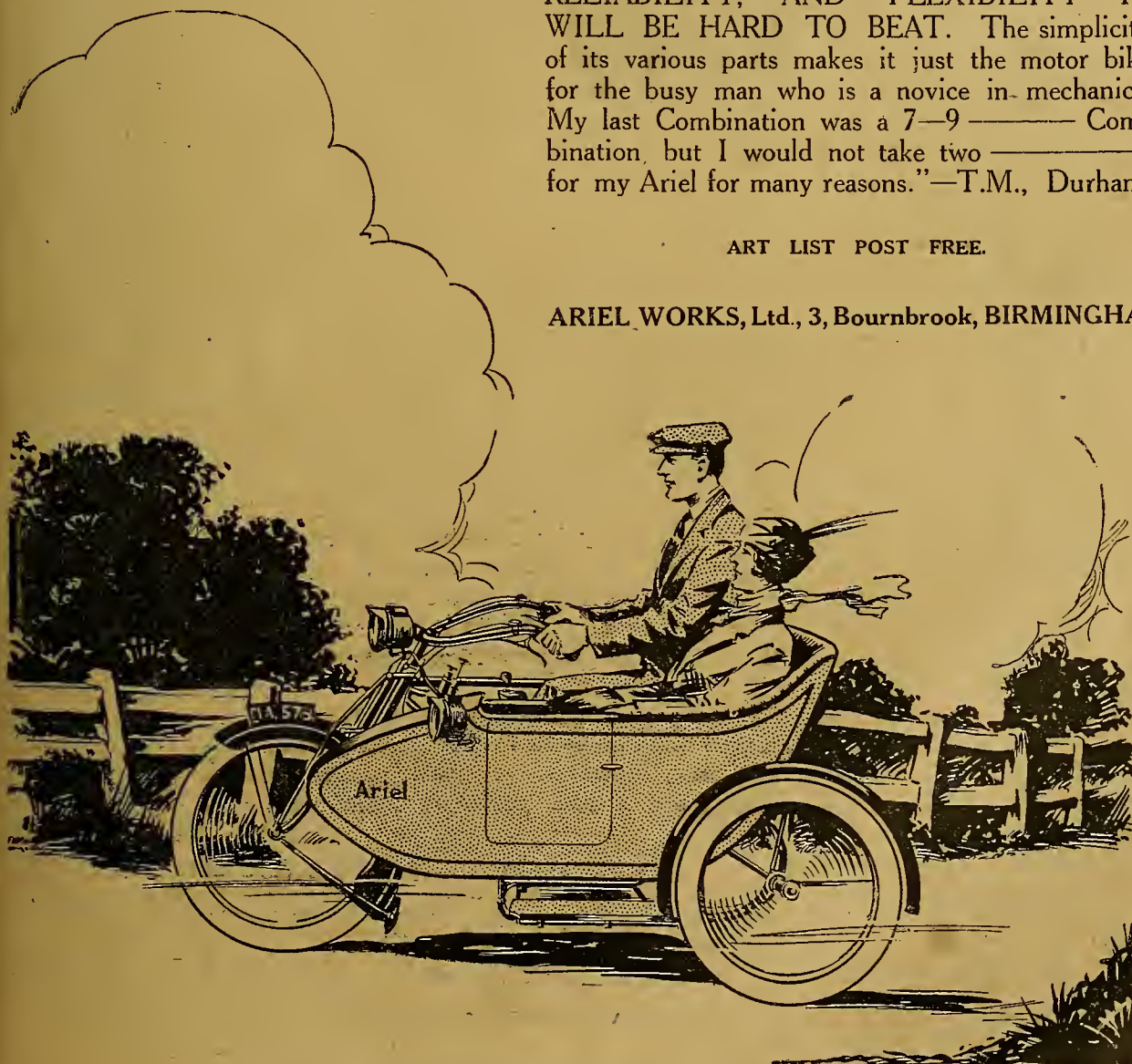
## OWNERS' OBSERVATIONS.

Would not exchange the Ariel for two machines of foreign make.

"After nearly twelve months' driving I can thoroughly recommend the Ariel Combination For ACCESSIBILITY, POWER, SPEED, ECONOMY GENERAL EFFICIENCY, RELIABILITY, AND FLEXIBILITY IT WILL BE HARD TO BEAT. The simplicity of its various parts makes it just the motor bike for the busy man who is a novice in mechanics. My last Combination was a 7-9 ——— Combination, but I would not take two ——— for my Ariel for many reasons."—T.M., Durham.

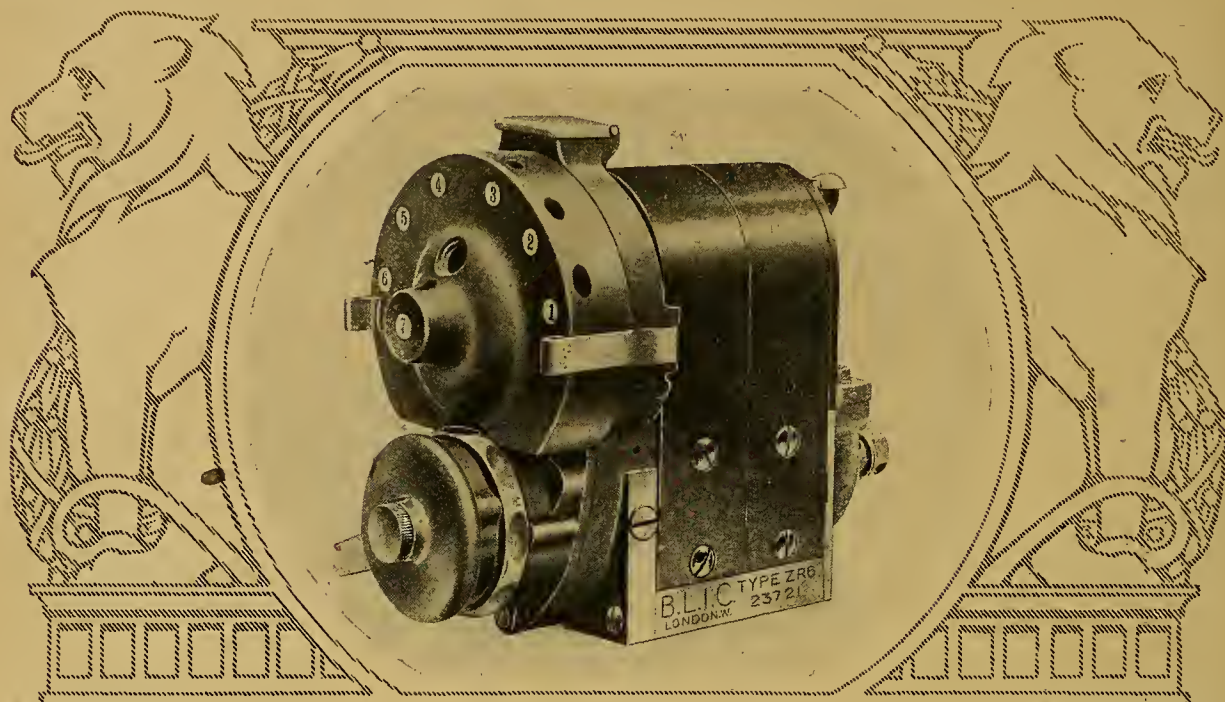
ART LIST POST FREE.

ARIEL WORKS, Ltd., 3, Bournbrook, BIRMINGHAM



*In answering this advertisement it is desirable to mention "The Motor Cycle."*





**British – and Best!**

**B.L.I.C.**

THE BRITISH LIGHTING & IGNITION CO. LTD.

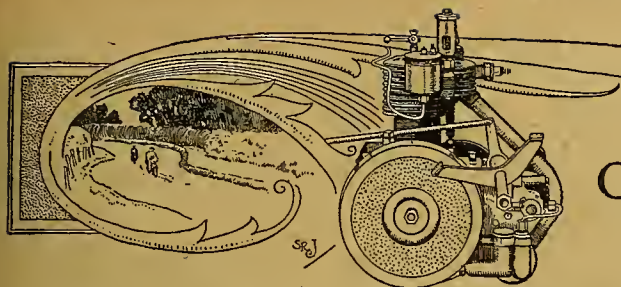
Built in a British Factory by British workmen, with a unique experience of magneto manufacture, the "B.L.I.C." embodies every scientific principle in design and manufacture. It is the most reliable magneto yet produced—British or foreign.

At present our works are entirely engaged in meeting the requirements of the British and Allied Governments. We trust, however, you will specify the "B.L.I.C." Magneto for your post-war requirements.

The BRITISH LIGHTING & IGNITION Co., Ltd.  
(Proprietors: VICKERS, LIMITED),  
204, TOTTENHAM COURT ROAD, LONDON, W.1.







## CONTROL LEVERS.

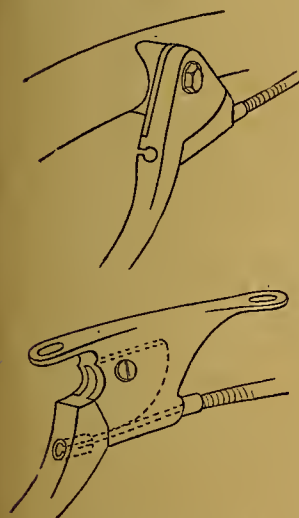
### A COMPARATIVE NOTE.

The controversy as to which type of handle-bar lever is best adapted to motor cycle use has aroused considerable diversity of opinion, one practical rider preferring the inverted variety, while another favours the outside or open type. Both designs have their weaknesses and both their strong points, so that judging from the many letters received and comments heard it amounts almost to a matter of personal taste which of the two is advocated.

**W**ITH the ever-increasing number of "assembled" machines there is a tendency towards a more common use of the outside, clip-on type of control lever, which, unless used for certain purposes, has little to commend it, except cheapness, whilst the neatness and the protection afforded to

the cable have induced most of the first-class manufacturers to adhere to the inverted lever type.

The slight lack of accessibility in the latter is compensated by the increase of reliability obtained by its advantages, the chief of which is the straight pull on the cable, secured either by specially designed parts, as in the Rover, with its barrel nipple; or the B.S.A., with its connecting shackle; or by holding the nipple loosely in a cup-shaped depression in the lever end, as in the Rudge and Triumph patterns, thus allowing a certain amount of self-alignment of the cable according to



TYPES OF OUTSIDE CONTROLS.

Scott. Showing secure method of fixing.  
Douglas. Neat and rigid.

the movement. A different state of affairs obtains with the outside lever, where the nipple is not only rigidly held, but is drawn through a large arc of small radius, thus bending the wire at the very point where its flexibility has been reduced by the sweating-on of the nipple, the resultant strain causing breakages of the strands which no amount of lubrication will prevent.

Where a large and powerful movement is needed there is no alternative but the outside lever, which draws the cable through a longer traverse, but the inverted, from its shape and position, allows the strongest gripping fingers to apply their utmost power at the maximum distance from the fulcrum.

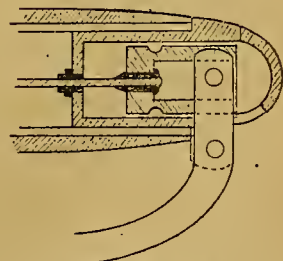
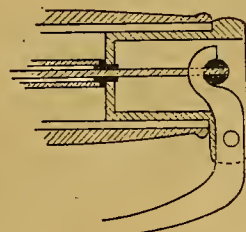
Manufacturers should pay greater attention to the method of fixing outside levers to the handle-bar in

order to prevent the irritating tendency of some varieties to creep from their position. The elimination of clips and screw heads would also tend to the preservation of the rider's gloves and cuticle.

A commendable type is used on the Scott machine, where one bolt, through the fulcrum of the lever, rigidly secures the fitting to the bars, whilst the Douglas, again, obtains permanent location on the handle-bar, although the method of stamping thin lugs from the solid body of the lever is to be deprecated, as these light attachments are rather weak in resisting either accidental blows or the combined effects of rust and vibration.

The superior accessibility of the outside lever is greatly dependent upon the method employed in fixing the nipple to the moving part of the lever; and while the manipulation of those in which it is inserted by passing the wire through a lateral slot is simplicity itself, the type where a small split collar is passed over the nipple and then drawn with it into a recess is particularly difficult to dismantle intact if at all rusty.

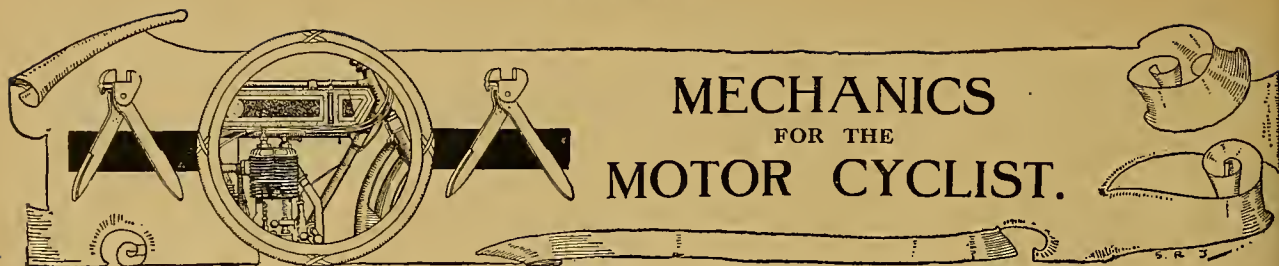
The whole of these small control details require periodical attention and constant protection against the weather, for rust is the great enemy of smooth operation, and frequent lubrication is essential if long life of the cables is desired. Half the troubles with controls might be eliminated at the outset if proper care were taken to use liberal applications of grease when assembling, and especially so when reassembling after a repair.



SECTIONS THROUGH INVERTED CONTROL LEVERS.

(Top) Rover. Barrel nipple rotating in end of lever.  
(Bottom) B.S.A. Shackle connection between nipple and lever.





## MECHANICS FOR THE MOTOR CYCLIST.

### Fourth Instalment: INERTIA (continued).

Previous instalments appeared on July 19th,  
August 9th and 23rd.

It is hardly necessary to point out to thinking motor cyclists the great desirability of a little mathematical knowledge—so many questions may crop up, as, for instance, the horse power required to mount a certain hill, the tension of a belt or chain when driving a heavy machine, or the calculation of a gear, that the man who is entirely ignorant of these matters must often be at a loss. In this and the following articles (of which there will be several) the author proposes to discuss some of the simpler problems dealing with speed, acceleration, force, inertia, centrifugal force, etc., and their practical application to everyday questions in a popular manner without unnecessary technicalities. No motor cyclist, therefore, need pass by these articles under the impression that they are beyond his understanding, for everything is explained in simple language.

**CENTRIFUGAL FORCE.**—This force is the resistance that a body exerts against any force compelling it to travel in a curved path. As its name implies, it tends to cause the body to fly away from the centre about which it is revolving. It is centrifugal force that flings the mud drops from the road wheels of a motor cycle, allowing the wind to transfer them to the rider's attire; centrifugal force lifts the sidecar wheel of a combination driven too recklessly round a left-hand turn; and it is almost solely due to centrifugal force that the solo rider is enabled to maintain his equilibrium. Perhaps this last notion, of centrifugal force as the motor cyclist's best friend, is novel enough to merit close examination.

The practised rider balances his machine so entirely automatically that the point I wish to make clear can best be appreciated by asking the reader to carry his mind back to the days when he was a learner; or, if his memory is unequal to this task, to the last occasion when he taught someone else to ride. He will then remember that the advice impressed upon the beginner is: To preserve your balance, steer to the side *to which you feel yourself falling*. If this principle is acted on promptly enough the machine always does right itself, or, strictly speaking, centrifugal force pulls it upright again. In the accompanying diagram, fig. 1, the rider is shown falling to the left; according to rule, he therefore steers in an arc of a circle having its centre also to the left; immediately centrifugal force begins to operate, acting in the opposite direction—to the right, as indicated by the arrow—and this has exactly the same effect in righting the machine as would a friendly push administered by the teacher, moreover, it ceases as the machine resumes its normal course.

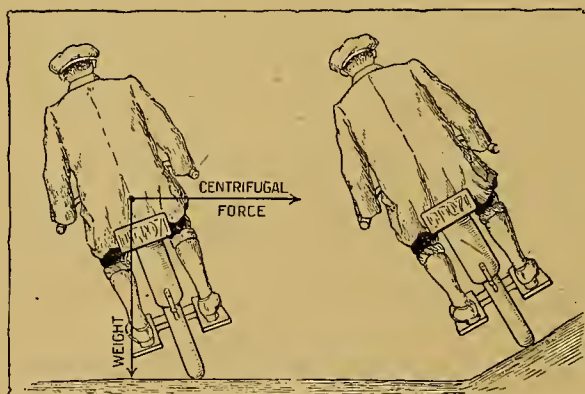


Fig. 1.—Showing how centrifugal force helps to maintain balance.

Fig. 2.—The reason why racing tracks are banked.

### The Track of a Bicycle.

In the early stages of his initiation the rider allows the cycle to acquire a considerable list before he gives the handle-bar the necessary correcting turn, with the consequence that he steers the serpentine course always associated with first lessons in cycling. As the learner's skill and confidence increase the tendency of the machine to gravitate to one side or the other is detected and corrected more and more rapidly, until eventually the correcting impulses are applied quite automatically. Even then, however, his progress along the road still takes the form of a series of wobbles, differing only in degree from those that marked his first attempt; he still has need of centrifugal force to hold him up. If you doubt this, try to keep the front wheel of your (solo) machine on a straight line on the road, say, the track of a motor car tyre, or try to ride with the steering head locked. Centrifugal force is not, of course, entitled to all the credit for keeping a bicycle upright. The rake of the steering column is so arranged that a certain amount of what may be termed mechanical balancing

is possible, the weight tending to assist steering.

The diagram (fig. 1), also serves to show what happens when a solo rider deliberately travels in the arc of a circle. When rounding a corner, he unconsciously adjusts the angle to which he leans inwards so that the pull of gravity is exactly balanced by the effect of centrifugal force. As the speed at which the corner is taken increases, so also does the centrifugal force (and consequently the inclination), until a point is reached at which the friction between the wheels and the road is overcome by this force; a disastrous sideslip then ensues. It is to avoid this danger that racing tracks are banked, thus allowing the wheels to be always more or less vertical to the surface.



**Mechanics for the Motor Cyclist.—**

The subject of vehicles on corners can hardly be left without a passing reference to the hoary old question: Which wheels of a motor car lift if the car is driven too fast round a corner? I rather fancy the Editor would be heartily glad if the reference could

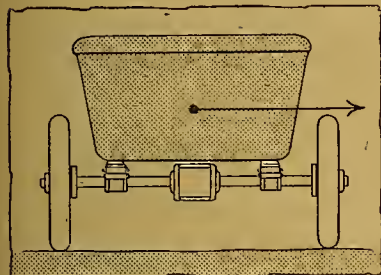


Fig. 3.—The centrifugal force which acts on a car turning to the left is shown by the arrow.

take the shape of an obituary notice—it is certainly time the question were decently and finally laid to rest—so he will not object; I hope, to one more effort to bring about this end. And yet, if the reader has followed me so far, there is little to be added to what has already been said. If, however, he is like the little boy who could do sums in eggs, but was baffled when the inspector substituted oranges, I will draw him another diagram (fig. 3). This represents a car traversing a *left-hand* curve, hence the centrifugal force acts to the *right*, as shown by the arrow. If a gang of men pushed against the car in the direction of the arrow, which wheels would you expect to lift? Obviously the left-hand wheels—those on the *inside* of the curve. Very well, then, the same wheels lift under the action of centrifugal force.

A whole number of *The Motor Cycle* could be filled with descriptions of the applications of centrifugal force in motor vehicles. A random selection would include mechanical horns, speedometers, circulating pumps, governors, and crankpin lubricators. There is, however, one effect of this ubiquitous force that may not be very generally known; this is the increase in belt tension which accompanies a rise in speed. The portions of the belt in contact with the pulleys are not in any way immune from the action of centrifugal force; hence, considering only these parts (*a a*, fig. 4), we see that they can only be held up to their work by forces *P P*, acting in opposition to the centrifugal forces *C C*. For this reason the belt must not

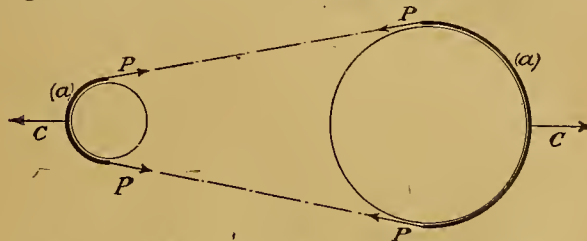


Fig. 4.—The effect of centrifugal force on a motor cycle belt

only be strong enough to transmit the engine pull, but it must also be able to withstand the additional tension due to centrifugal force. A belt which would do its duty quite satisfactorily at low speeds might, therefore, slip or break at high speeds. It is this factor that limits the speed of the leather or textile belting used for driving high-speed machinery such as dynamos.

MOHANDIS.

(To be continued.)

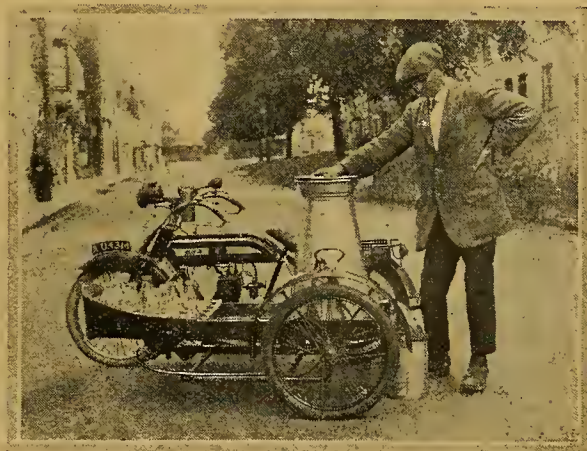
## Motor Spirit Licences for Motor Cycles.

THE present petrol licences issued to motor cyclists expire on the 30th of this month. The Petrol Control Department is now issuing forms to the holders of these licences, which have to be filled up. The form is entitled "Form of application for a full-duty motor spirit licence for a motor cycle to be used for business purposes or public duties." If the application is based upon requirements for work connected with the prosecution of the war, a certificate must be obtained from the Government Department, Public Authority, or War Organisation concerned in support of the application, which certificate must accompany the form.

### The Particulars Required.

The form demands the name and full postal address of the applicant (to be typed or written in printed characters), his profession or occupation, the registered number of the motor cycle, the name of the registered owner, the amount of tax paid on the motor cycle, the make and horse-power, the business or public duties which necessitate the use of a motor cycle, the monthly mileage run on such business or public duties, the number of gallons of motor spirit now in stock, and the number of gallons of motor spirit required per month. On the back of the form the number of the existing licence, the total number of gallons licensed, with the number allowed per month, and the total number purchased, are to be

stated, and the form finally signed by the applicant. There is also a reminder that any false statement renders the applicant liable to a penalty of £100.



### A DAIRYMAN'S SIDECARRIER.

There is no doubt whatever that when normal times arrive sidecarriers will be more popular than ever, and will be seen by the score in every town taking the place of the milk vans, bakers' and butchers' carts. The B.S.A., to which a milk carrier is attached, belongs to Mr. Long, of Newnham, who speaks highly of its economy and utility.



# Current Chat

## TIMES TO LIGHT LAMPS.

### GREENWICH TIME.

Sept. 20th	...	6.34 p.m.
" 22nd	...	6.29 "
" 24th	...	6.24 "
" 26th	...	6.20 "

## A Prisoner of War.

M. Arnaud, who previously represented the Hutchinson Tyre Co. in England, was called to the colours with the French Army at the beginning of the war, and was taken prisoner in 1914. Unfortunately, he has had to remain in durance vile in Germany just on three years.

## A Famous Actress's Associations.

It is not generally known that the husband of Miss Evie Greene, the actress, who died on the 11th inst., was Commander E. K. Arbuthnot, R.N., a cousin of the late Rear-Admiral Sir R. K. Arbuthnot, Bt., K.C.B., M.V.O. Commander Arbuthnot was mentioned in despatches in the early part of the war while serving on the *Arethusa*.

## Petrol for Business Purposes.

The Automobile Association has been informed by the Treasury that they cannot refund any part of the local taxation licence to owners whose petrol licences have been cancelled since July 1st. Where the Petrol Controller is satisfied that allowances have been sparingly used for business purposes and are still essential, current motor spirit licences will be issued in exchange for those which are inexhausted but out of date.

## The Road Board.

The seventh annual report of the Road Board was published on September 13th. It states that during the year which ended on March 31st last applications were received for £1,051,509, of which £966,510 was for "improvement of road crusts."

During the current year the Board is distributing, with the Treasury sanction, the sum of £200,000 out of the Road Improvement Fund mainly in the form of assistance to expenditure on tar treatment.

The report goes on to state that, at the request of the Local Government Board, the Board has examined the proposals of the recent Metropolitan Arterial Road Conferences for the construction of about 130 miles of approach roads to London, seventy miles being entirely new. These proposals, if their execution were proceeded with continuously, might involve an expenditure, by all

parties concerned, of considerably over £10,000,000, and it might approach £15,000,000.

The highway authorities concerned have made it clear that they are not prepared to provide any considerable portion of the expenditure, and no possible source of revenue is in sight.

## A Year of Prosperity.

Despite the war and the entry of America into the struggle, the Hendee Manufacturing Co., Ltd., has just terminated its most successful year since 1913. Khaki motor cycles and sidecars bearing the insignia of the Medical Department of the U.S. Army are being completed by hundreds. Prices will be raised next year as some of the materials used have gone up 300%.

## A Pioneer Motorist.

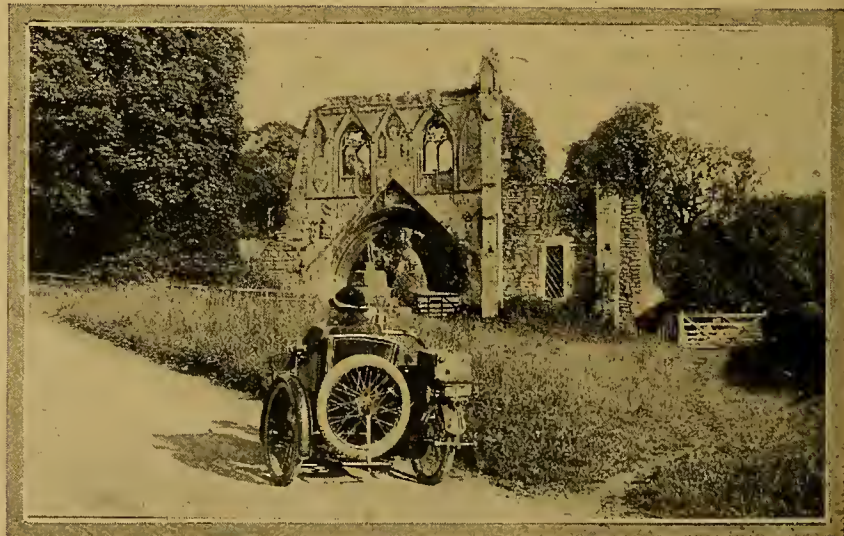
A pioneer motorist, Mr. J. H. Knight, died at Barfield, Farnham, recently. He was seventy years of age when he died, and was one of the most successful of the early pioneers. He constructed one of the first cars driven by an internal combustion engine in Great Britain in the year 1895, the year of the founding of our sister journal, *The Autocar*, and one year before the passing of the Motor Car Act. The late Mr. Knight was summoned by the local police and fined 2s. 6d. for allowing his car to travel on the road without being preceded by a man carrying a red flag.

## SPECIAL FEATURES.

DYNAMO LIGHTING.  
WARTIME OVERHAUL.  
PICTURESQUE HAMPSHIRE.

## A Motor Cycle Theft.

A correspondent of ours advertised a two-stroke Clyno recently in *The Motor Cycle*. Two young men called in answer to the advertisement one Monday evening, and came again on the Wednesday, gave the vendor a worthless cheque, took the machine away, as agreed, for a day's trial, and left a false address. A few days later the thieves were caught. Our correspondent's motor cycle was recovered, as well as another of the same make. During the proceedings at the Court it transpired that the miscreants had given two other worthless cheques in exchange for a Triumph and sidecar and a Rudge-Multi. The case finally came up at the Old Bailey, when the younger prisoner was acquitted on condition that his father took care of him, while the other was sentenced to six months in the second division, and it was stated that he was a deserter from the Army. The Triumph and Rudge machines which they had stolen had been sold, making it still more awkward for their victims. We trust this will be a warning to others when accepting cheques for second-hand motor cycles not to part with their machines until the cheques are cleared.



ON THE YORK-SCARBOROUGH ROAD. The ruins of the Early English gateway (1121) of Kirkham Priory, thirteen miles from York. Founded by Walter Espec for Augustinian canons in memory of his son. The sidecar is a 1916 4 h p. A.J.S.



# Will of Lient. I. B. Hart-Davies.

Lieut. Ivan B. Hart-Davies, R.F.C., of Rugby, who was killed whilst flying on July 27th, has left property to the value of £8,679.

# Petrol Wastage.

We noticed a military motor cyclist the other day stop outside a village post-office, and leave his machine for some minutes reclining on one footrest, while petrol simply streamed from the carburetter. It would have been just as easy to lean it on the other rest, in which case the carburetter would not have flooded, but the wastage of petrol evidently did not trouble him.

# "Jack" Woodhouse, M.C., D.S.O.

Capt. John Whitaker Woodhouse, M.C., R.F.C., Special Reserve, has been awarded the D.S.O. for conspicuous gallantry and devotion to duty in carrying out special missions by night, during which he has frequently been compelled to face very bad weather. In the course of numerous bombing expeditions by night he invariably descended to very low altitudes in order to use his machine gun against hostile troops on the roads. He has consistently set a very fine example.

# Starting Up in Cold Weather.

Now the weather has turned colder, users of war-time spirit may find that, though their engines start up fairly easily after an injection of petrol, they are apt to stop after racing a few seconds, refusing to start again till another injection has been given, and so on till warm. This is not the fault of the carburetter, which, therefore, should not be tampered with. It is caused by the first vaporisation of the fuel inducing such an extremely low temperature in the induction pipe—which, if touched, will be found almost ice-cold—that further vaporisation is impossible. The trouble can be removed by pouring hot water over the induction pipe before attempting to start.

# Average Prices.

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks must inevitably occur.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C.	1914	3 1/2 2-speed	—	£40
Abingdon	1914	5-6 3-sp. sidecar	—	£54
A.J.S.	1916	6 combination	—	£92
"	1914	6 combination	£68	£68
"	1916	4 combination	—	£75
Allon	1916	2 1/2 2-speed	£25	£32
"	1914	2 1/2 2-speed	—	£27
Ariel	1915	3 1/2 3-sp. comb.	£73	—
"	1914	5-6 combination	£60	£50
Bat	1914	6 3-speed	—	£45
Bradbury	1914	4 2-sp. sidecar	—	£40
Brough	1916	3 1/2 2-speed	£53	£55
B.S.A.	1916	4 1/2 sidecar	£67	£65
"	1915	4 1/2 sidecar	—	£57
Calthorpe	1916	2 1/2 2-speed	£25	£30
"	1915	2 1/2 2-speed	—	£26
"	1916	2 1/2 2-stroke	—	£28
Clyno	1915	2 1/2 2-stroke	—	£25
"	1914	6 combination	£65	£65
Connaught	1915	2 1/2 2-stroke	£27	£24
Douglas	1916	2 1/2 2-speed	£50	£46
"	1915	2 1/2 2-speed	£44	£42
"	1914	2 1/2 2-speed	£42	£37
Enfield	1916	6 combination	£85	£83
"	1915	6 combination	—	£70
"	1916	3 2-speed	£44	£46
H.-Davidson	1916	7 combination	£82	£85
"	1915	7 combination	£65	£65
Henderson	1916	10 combination	—	£100
"	1915	10 combination	£76	—
Humber	1915	6 combination	—	£60
Indian	1916	5 combination	—	£70
"	1916	7-9 combination	£81	£82
"	1915	7-9 combination	£63	£65
James	1916	4 1/2 combination	£65	£70
"	1916	2-sp. 2-stroke	£36	£31
Lea-Francis	1916	3 1/2 3-sp. sidecar	—	£63
"	1915	3 1/2 3-sp. sidecar	—	£55
Levis	1916	2 1/2 Popular	—	£24
"	1915	2 1/2 Popular	£24	£22
Matchless	1915	7 combination	£78	£83
New Hudson	1916	2-sp. 2-stroke	—	£28
"	1916	4 combination	—	£60
New Imperial	1916	2 1/2 2-speed	£35	£33
"	1915	2 1/2 2-speed	£30	£26
Norton	1916	3 1/2 2-speed	—	£52
"	1915	3 1/2 T.P.	£43	£43
P. & M.	1915	3 1/2 combination	£75	£67
"	1914	3 1/2 combination	—	£50

Make.	Year.	H.P.	Average last week.	Previous weekly average.
Premier	1915	2 1/2 3-speed	—	£48
"	1914	3 1/2 3-speed	—	£51
Rover	1916	3 1/2 3-speed	—	£55
Royal Ruby	1916	2 1/2 2-stroke	—	£24
Rudge	1916	3 1/2 Multi	£42	£45
"	1915	3 1/2 Multi	—	£40
Scott	1916	3 1/2 combination	—	£60
Sun	1915	2 1/2 2-speed	—	£22
Sunbeam	1916	8 combination	—	£101
"	1916	3 1/2 solo	£69	£74
"	1915	3 1/2 combination	—	£76
Triumph	1916	2-sp. 2-stroke	£35	£38
"	1915	4 countershaft	—	£55
"	1915	2-sp. 2-stroke	£36	£27
Velocette	1915	2 1/2 2-sp. 2-stroke	—	£27
Zenith	1915	8 Gradua	—	£60

# The New Petrol Licences—Tear-off Coupon System to be adopted.

We have had an opportunity of seeing the new petrol permits which will be issued to motor cyclists on October 1st. They are of the tear-off coupon type with counterfoil, and each coupon is for half a gallon. When the petrol is purchased the coupon must be signed by the seller and the purchaser, and the counterfoil by the seller. On the back of the coupon is printed the following: "Motor spirit obtained by this licence may not be used for purely private or pleasure purposes." The ordinary licence will be for two gallons a month, as before.

The sellers will have to retain all coupons, and on presentation of these to the wholesale distributing houses the latter will supply just the amount of fuel which the said coupons represent.

# Two-strokes and Substitute.

It is a curious fact that many two-stroke engines pull better on a mixture of petrol and substitute than they do on pure petrol. This certainly does not apply in the case of four-strokes, and the difference is curious.

# The National War Funds.

At the week-end the principal war relief funds stood as follow:

British Red Cross Fund	£7,259,880	0	0
Tobacco Fund	136,920	0	0
The Queen's Work for Women Fund	173,234	9	9

# S.C.'s AFTER SPECIAL PARADE.

Birmingham special constables returning home last Sunday morning after drill on the Aston Villa Football Ground. Some of them, it will be observed, are still able to use their sidecars, but the majority of owners are debarred in consequence of the non-renewal of their petrol licences. To specials living on the outskirts of the city this is particularly irksome, and even a small quantity of fuel would be a boon, many of them having miles to walk after duty in the early hours of the morning.





## Dynamo Lighting Units and their Functions.



### Some Simple Explanations of Electric Lighting Installations for Motor Cycles.

**E**LECTRIC lighting is rapidly gaining favour among motor cyclists, and it is only a question of time before it becomes as universal on the motor cycle as it is to-day on the car.

The principal difficulties to be overcome in the design of a motor cycle set are size, weight, and cost, but that they are not insurmountable is proved by the success and increasing popularity of the Lucas dynamo set.

Provided sufficient care is taken in the selection and installation, the alternative accumulator electric lighting is perfectly reliable, and only requires a little care and consideration. The presence of a dynamo, however, relieves the rider of all worry regarding the state of his battery, and renders him independent of garages.

The dynamo is similar to the magneto in that it produces an electric current when a mass of copper wire wound on a special iron core, called the armature, is revolved between the poles of a powerful magnet, but, while the principle is the same, the method of construction is totally different.

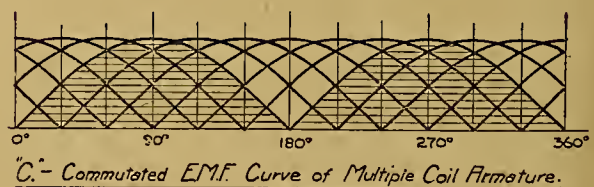
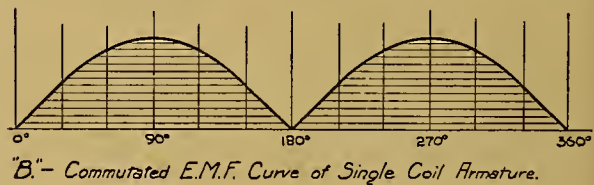
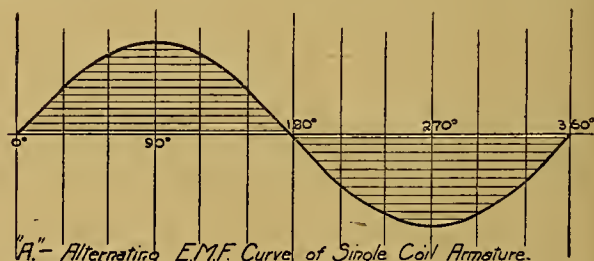
The magnets of a magneto are permanent magnets. That is to say, the magnetism is a peculiar physical property possessed and retained by the steel of which the magnets are composed, and is independent either for its strength or its existence on the remainder of the mechanism. The armature of the magneto is a soft iron forging of H section, having a primary or generating coil wound over the central web. When this coil is rotated in the magnetic field provided by the permanent magnets a difference of potential or electro-motive force (abbreviated e.m.f.) is produced at the ends of the coil, and if these terminals are joined by a conductor a current will flow from one to the other. This current is alternating in character, that is, it changes direction twice in each revolution, attaining a maximum at two diametrically opposite points, and dying down to zero at the intermediate positions. Plotted out along a straight line it can be represented graphically as shown by curve A. If, however, the ends of the coil are coupled to two insulated segments of brass mounted on the end of the armature, to revolve with it, and two stationary metal brushes are then provided to bear against the segments, the alternating current is rectified or "commutated" into a pulsating current flowing in one direction only, and the instrument is then a dynamo.

#### Construction of the Dynamo.

The arrangement of such an armature is shown diagrammatically in the line drawing, and the effect

on the e.m.f. wave by curve B. This is called a "direct" or "continuous" current, and as it flows in one direction only is suitable for charging accumulators, though either continuous or alternating current can be used for lighting lamps direct from the generator. Owing to excessive commutator sparking and lack of efficiency, a pulsating continuous current, as indicated by curve B, is never used in practice, and to overcome these defects a special type of armature wound with a number of coils is used instead. This armature consists of a large number of thin sheet iron laminations, having slots formed in the circumference in which the coils are wound. The two half-segments of brass are replaced by a number of copper bars insulated from each other and from the shaft and core by means of mica strips.

The several ends of the armature coils are connected to the copper bars (called commutator segments) in a special manner. The collecting brushes, composed of either hard carbon blocks or compressed copper gauze, bear on the commutator at certain definite positions depending on the method of winding the





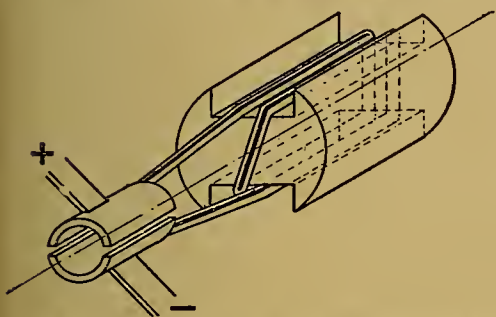
### Dynamo Lighting Units and their Functions.—

armature and number of poles on the magnets. With this design practically no pulsation occurs, and a steady continuous flow of current is given.

The line drawing shows in diagram form part of what is known as a "ring type" armature, and illustrates clearly how the coils for this type of armature are connected to the commutator.

### Electro Magnets.

A dynamo with permanent magnets would be quite satisfactory if the magnets were of sufficient strength, but by winding them the magnetic flux is very much increased, and a more efficient instrument is arrived



*A Single Coil Armature with Commutator producing E.M.F. Curve "B."*

at. The permanent magnet dynamo would be much too heavy for motor cycle use, as its output would be greatly dependent on large and heavy magnets. An electro-magnet, consisting of a steel casting or forging having coils of wire wound round the poles and connected to the two commutator brushes, is employed. When starting up the machine there is a fractional amount of magnetism, which is termed residual magnetism, always present in the steel. This is sufficient to induce a small e.m.f. in the armature, and so, when rotated, the unit excites itself. The e.m.f. then becomes steady and remains so for as long as the speed continues constant.

To summarise briefly the various items mentioned above, the dynamo consists of—(a) the armature; (b) the commutator; (c) the brushes of carbon or copper serving merely as collectors; (d) the field magnet which usually surrounds the whole, and acts also as an enclosing case, the chief function of which is to provide the necessary magnetic field within which the armature revolves.

### Governing the Dynamo.

The observant reader will have noticed when describing the building up of the magnetic field that no further rise in e.m.f. takes place above the normal when the speed is constant. He may therefore be tempted to enquire what takes place when the dynamo is driven by such a variable source of power as a motor cycle engine. This is where the motor cycle or car lighting dynamo differs from the stationary type, and the solution of this problem is the key to the successful lighting outfit. The voltage at the brushes varies as the speed of the machine changes. The faster the revolutions the higher the e.m.f. As designed and manufactured for stationary use the dynamo is essentially a constant speed machine, and whilst slight fluctuations in speed can be compensated

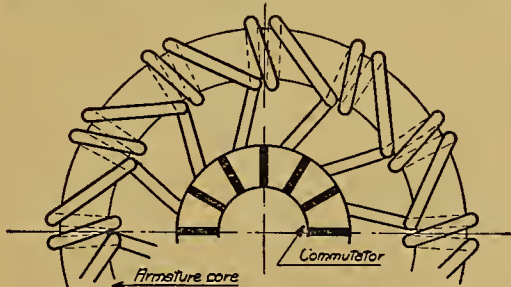
by hand regulation of the intensity of the magnetic field, such regulation is, of course, impossible on the road. The motor vehicle dynamo is, therefore, designed to be electrically or mechanically self-regulating. The latter method entails some form of slipping clutch working on the centrifugal principle, which slips proportionately after a certain definite speed has been attained. This type of machine is satisfactory provided care is taken of the clutch. It is, of course, liable to wear, which upsets its adjustment. The electrical method of regulation is the more reliable, and generally consists in introducing means whereby the armature coils have a demagnetising effect on the field after the normal speed and voltage is reached, and retaining the voltage constant in the event of the speed rising. In some designs this necessitates an extra brush on the commutator situated at some fixed point between the main brushes, and connected to the switch box by means of a separate "control" wire.

For purposes of comparison and identification, the output of a dynamo is expressed in "watts," its pressure or e.m.f. in "volts," and its current in "ampères." The watts are obtained by multiplying the volts by the ampères.

A dynamo capable of supplying a current of five ampères at a pressure of six volts would therefore have a total output of thirty watts.

### Accumulators.

The accumulator, or storage battery, which represents the reservoir of the dynamo lighting set, is a chemical contrivance which depends for its action on the chemical effect produced on a pair of prepared lead plates immersed in dilute sulphuric acid when a current of electricity is passed from one to the other through the liquid. The instant the battery terminals are joined up externally, a current of electricity flows



*A Simple Type of Multi-coil Armature producing E.M.F. Curve "C."*

between the two terminals and in an opposite direction to the original charging current which produced the chemical change. The amount of energy which can be obtained from the battery is not equal to the amount put in, the efficiency being less than 100%, but the advantage of the accumulator lies in the fact that it is equivalent to storing the electricity, which is therefore available no matter to where the battery is moved. It is essential to remember the accumulator does not generate electricity, and stores it only by transforming the electrical into chemical energy.

Each cell of an accumulator (which may consist of any number of cells joined in series) is capable of giving two volts on discharge, no matter what the size of the cell, and will require from  $2\frac{1}{4}$  to  $2\frac{1}{2}$  volts to charge it. A three-cell battery, giving a total pressure of six volts, is the usual type chosen for motor



**Dynamo Lighting Units and their Functions.—**

cycle dynamo sets, and this is used in conjunction with six-volt bulbs in the lamps.

**The Necessary Capacity.**

Assuming a 12 c.p. (candle-power) bulb in the head lamp and 3 c.p. bulbs in the side and tail lamps, the capacity of the battery should be at least thirty ampere hours. The term ampere hours is the product of the normal output of the battery in amperes on discharge, and the number of hours this current is available continuously without the voltage falling below 1.8 volts per cell, *i.e.*, 5.4 volts for a battery of three cells. If discharged below this voltage there is a danger of the battery suffering permanent damage owing to a further chemical action called "sulphating."

The battery in the Lucas set is of 22 amp. hour capacity, used in conjunction with a double filament bulb in the head lamp, giving 3 c.p. or 20 c.p. as desired. The smaller light is used when standing or travelling slowly—the lamps under these conditions being fed direct from the battery. The larger light is in use when running above 15 m.p.h., in which case the dynamo supplies the whole of the current for all the lamps and, in addition, a small charging current to the battery. The double filament bulb is controlled by a rotating switch on the head lamp.

**Automatic Switch.**

If the dynamo were connected permanently to the battery, the latter would discharge back through the dynamo when the engine stopped. This would result in the complete discharge of the battery, and might cause damage to the dynamo through the passage of an excessive current. There would further be the risk of the battery suffering from over-charging on long non-stop runs in daylight.

To overcome the possibility of these defects a switch which allows the rider to disconnect the battery when fully charged is usually placed in the charging circuit. In addition an automatic switch is sometimes incorporated with the switch box. The function of this latter is to break the connection to the battery when the voltage of the dynamo falls below that of the battery, or at the point at which the battery would commence to discharge back through the dynamo. It also keeps the battery disconnected on starting up

until the dynamo voltage rises to a predetermined point slightly in excess of the battery voltage, when it automatically switches the battery on charge again. Its automatic action relieves the owner of worry in traffic, and also when stopping for any length of time.

To prevent any possibility of the lamps being lit from the battery only, with the dynamo revolving idly, when the vehicle is in motion, the Lucas switch is arranged to put the battery on charge when the lamps are on. In this way it is practically impossible to suffer from a discharged battery when on the road at night, unless the machine is left standing for some time with the large filament of the head lamp alight.

**Simplicity of the System.**

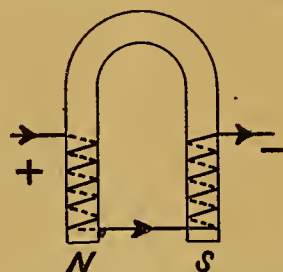
When replacing bulbs special care must be taken to select renewals of the voltage and candle-power specified by the makers. It is possible for the user to do considerable damage to his dynamo and battery by the use of unsuitable bulbs, which, whilst giving a pleasing light, may entail, through excessive current consumption, too great a strain on the system.

The wiring of a dynamo set is simple. Full instructions are always given by the makers, and all terminals on the dynamo, etc., are correspondingly lettered. In view of the general knowledge gained by the use of the magneto, it is perhaps superfluous to warn against the formation of leaks and short circuits in the wiring by damage due to excessive vibration, fraying, or careless fixing.

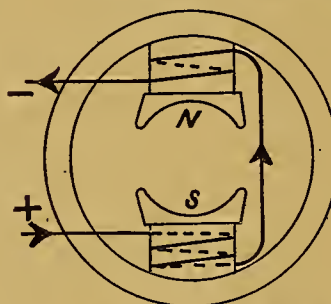
From the above explanation, which the writer has endeavoured to put in simple language, the dynamo

lighting set will be seen to comprise—(a) the dynamo, which requires no attention beyond periodical oiling; (b) the battery, needing the addition of water only at weekly intervals, and daily charging when the machine is on the road (this entails nothing more than turning on the switch); (c) the switch box, containing all the gear the rider is called upon to operate, including in some cases a "fuse" (the fuse acts as a safety valve for the system and fuses in the event of damage to the wiring, battery, or dynamo, and requires nothing more than keeping intact); (d) the wiring and lamp bulbs, which any motor cyclist is capable of handling. Not a very formidable list after all, and one of which the rider need not feel afraid.

FRANCIS E. SCHOFIELD.



*A Simple Type of Electromagnet.*



*Type of Electromagnet frequently used on Dynamo Lighting Sets.*

**COAL GAS.**

IN the hope of partially damming the stream of enquiries that daily reaches us, we may say that at present there is no practical means of using coal gas on solo mounts except for runs of less than five miles. A sidecar chassis must be attached for the gas bag, which offers so much wind resistance that it is hardly applicable to low-powered mounts.

There is no reason why users of a substitute on route work should not start up on coal gas. A rubber pipe connection from the main at home, and a similar connection at the garage, would enable one to warm up at either end before switching on to the substitute, thus eliminating the starting nuisance. A small petrol tank might be carried in case of stoppage *en route*.



## BRITISH IMPORTS AND EXPORTS.

**I**MPORTS of motor cycles, as everyone knows, have completely ceased; and the value of tyres and accessories sent to this country during August is infinitesimal, amounting only to £2,417. In August, 1915, the value of imported motor cycles and parts was £38,582; in August last year, £8,182.

### BRITISH EXPORTS FOR AUGUST.

It is stimulating to observe the remarkable manner in which the exports of motor cycles have been maintained. Compared with August of 1915 there is an increase of £25,000, and an increase of more than that amount over the figures for July, 1917.

	1915	1916	1917
Number of motor cycles	1,092	1,322	1,263
Value of motor cycles, parts, tyres, accessories. . . . .	£79,866	£100,027	£105,383

### PETROL FIGURES.

#### Number of gallons imported in August:

	1915	1916	1917
	17,373,010	28,773,053	7,853,368

The number of gallons imported during the seven months of this year was:

January .. .. .	13,001,740
February .. .. .	12,257,984
March .. .. .	9,246,546
April .. .. .	10,258,951
May .. .. .	12,270,934
June .. .. .	11,327,434
July .. .. .	12,346,846
August .. .. .	7,853,368

There is food for thought in the petroleum import figures (these, of course, includes petrol, and lamp, lubricating, gas, and fuel oils). We received 80,915,616 gallons last month, which is 4,000% increase on the August figures for 1915 and 1916.

On the other hand, we imported 20,919,685 gallons less petrol last month than in August, 1916.

## STANDARDISATION OF MOTOR CYCLES IN U.S.A.

**T**HE American manufacturers have decided, as we have already stated, to standardise certain features in the manufacture of motor cycles for military purposes. The following parts and measurements were approved as features suitable for standardisation:

**RIMS.**—All rims for military motor cycles, front and rear, as well as for sidecars and rear cars, to be 28×3.

**TYRES.**—Clincher type, 28×3 for all wheels.

**SPOKES.**—Length, 10½in. from neck of head to tip for all wheels.

**NIPPLES.**—Length under head, ½in.; thickness of head, ¼in.

**SPARKING PLUGS.**—18 mm. metric plug adopted for all military machines.

**HEAD LIGHT MOUNTING LUGS.**—Head of lug, ¼in. wide; lug, 3¼in.

**HEAD LAMP SUPPORT BRACKET.**—Head of prong, 1½in.; diameter of prong, ¾in.

**MAGNETO BASE.**—It was the decision that the magneto base and height could be standardised, but that further definite information should be obtained.

**CHAINS.**—All military motor cycle driving chains to be of the roller type, ½in. pitch; roller width, ¾in.; roller diameter, .40in.

**THROTTLE CONTROL.**—Handle-bar grip type placed on right side, and operator to open throttle by twisting top of grip towards centre.

**CLUTCH PEDAL.**—To be placed on the left side and brake pedal on right.

**GEAR CHANGE.**—Owing to the fact that some of the gear changes operate by a movement of the lever up and down, others forward and back, with sometimes the high gear in front and sometimes the high gear in the rear, it was decided that the matter of further standardisation of this feature should be held in abeyance for the time being.

**KICK STARTERS.**—To be of the folding pedal type, oil and fuel pipe fittings to be ½in.

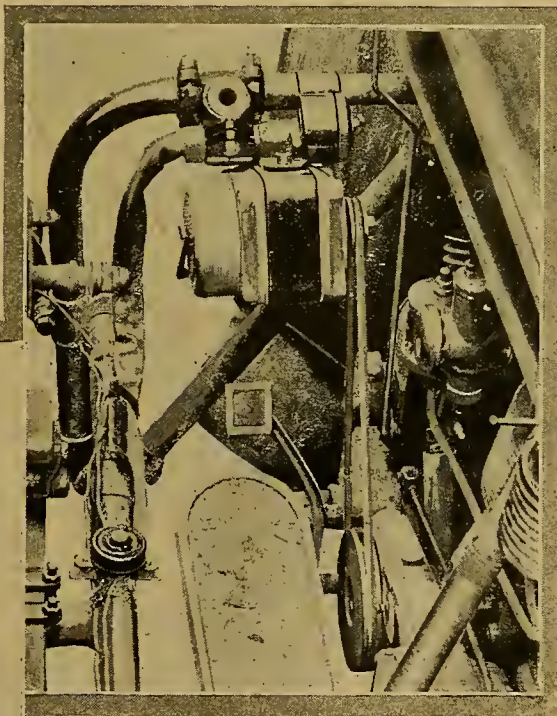
**CYLINDER DISPLACEMENT.**—61 cubic inches.

**CARRYING CAPACITY.**—The maximum strong load on a military motor cycle and sidecar not to exceed 500 lb., including rider.

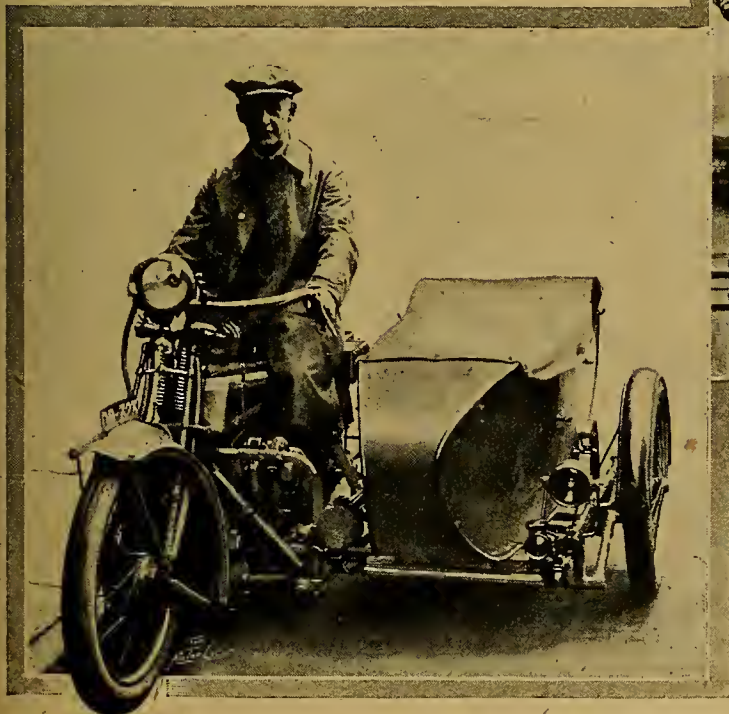
## THE TANKS' DEBUT.

**S**ATURDAY last was the anniversary of the first appearance of the Tanks which created such terror in the German lines on the occasion of their first going into action. It may be remembered that *The Motor Cycle* found, examined, and classified some hundreds of men for the M.G.C. Heavy Section now known as the Tank Corps.

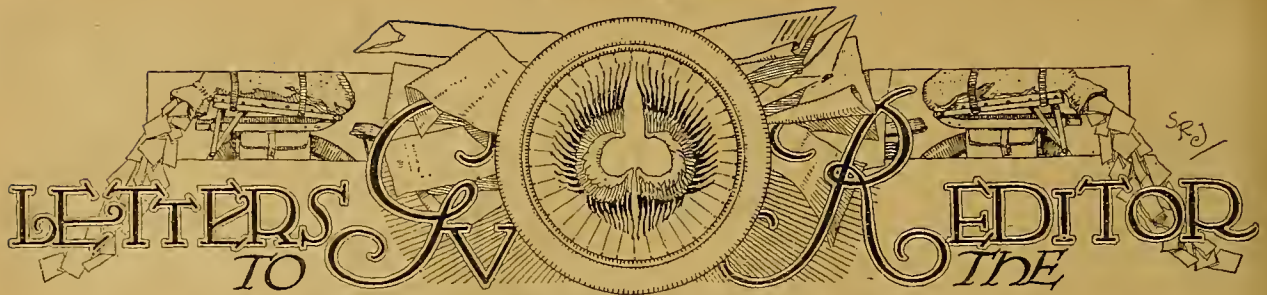
### AN ORIGINAL POSITION FOR A DYNAMO.



An ingenious way of carrying an electric generator on an A.J.S. outfit has been devised by Mr. Ernest Baydell. It will be seen that he has fixed it to the front sidecar support in such a position that the dynamo pulley lines up with the pulley on the engine shaft. The cables have been enclosed in a cycle tyre tube—quite a good idea. The batteries are carried under the sidecar seat. Note the foot-operated switch for the electric horn.







The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Herford Street, Coventry, and must be accompanied by the writer's name and address.

#### THE SCOTT SOCIABLE.

Sir,—Why do we never read more about the Scott Sociable in *The Motor Cycle*? There must be many people like myself who, since reading the accounts of it in your delightfully interesting paper, are anxious to hear more.

F. SLAWSON.

#### A POWER UNIT WITHOUT MAGNETO.

Sir,—With respect to Dr. Low's criticism of my design of two-stroke engine without magneto or carburetter in your issue of August 30th. In this criticism in line 11 we read: "And as the fuel is in the form of a liquid the rising pressure

As the fuel is gasified when passing the exhaust pipe and enters the compression cylinder as a gas at high temperature, I cannot see how the fuel can be regarded as liquid.

H. E. BEYER, Lt., R.E.

#### THE CRITICS.

Sir,—Might I suggest, through your paper, that, after the war, manufacturers should give their customers the choice of the orthodox lever or "twist grip" controls. I, for one, should plump every time for the twist grip.

I myself know that a number of people who ridicule this method have never had any experience of it. In fact, I used to do so myself.

My ideal solo machine would be a 3½ h.p. B.R.S. Norton engine in a really good spring frame, fitted with a Schebler carburetter and twist grip controls. But as, at present, the above is impossible, I ride a "big Yank" which gives me three of the items.

It has also another great point in its favour, that is, dead silent valve gear. How many British machines have that?

All said and done, I think "Ex-Sergeant M.M.G." will agree that in many respects the American machines are far ahead of us.

INDIAN.

Wood Green, N.

Sir,—The letter of "Ex-Sergt. M.M.G.," though having nothing to do with me, certainly gets my back up. He leads off with the biggest insult one soldier can offer another, and in the whole of the letter I fail to see anything to convince anyone that the English-made motor cycle excels the American. I myself go plump for the American, and will give a few reasons for so doing: The English manufacturers are too conservative, and many a good machine dies before it has ever really come out. The only big alteration of design in the last three years has been the sloping tank and countershaft gear. I do not think that is much to brag about. We use out here (B.E.F.) a well-known English make; its faults are legion and its good points nil. The spring fork is not a spring fork—just a shearing force on the steering head. Its clutch is a copy of the Harley-Davidson, but it has no adjustment, and the screws that hold it together screw into sleeves which turn round and cannot be gripped by any tool yet made in the engineering world. The handle-bars have six levers on them—exactly six too many—in addition to these you have a pull-and-push oil pump. I could go on reciting faults galore, but will suggest which American designs already on the market could be taken up by our manufacturers: Harley-Davidson spring forks and lubrication, 28×3in. wheels, loop frame, overhead inlet valves, all tappets central hitting, and last, but not least, a chain punch in the toolkit. Although all our machines here for over the last two years have been chain-cum-belt, the fine equipment of tools and spares has never held a chain punch.

B16

I should like to say that I agree with "Ex-Sergt." on the two-stroke question. But what is a "twicer"? I still contend that in the 8-10 h.p. class the American leads in price and design. There would be many more American machines sold in England to-day but for the Englishman saying, "It is American." I used to, but, once I tried an American mount, I lost faith in the English. I suppose this item will call forth more talk about shooting. Still, I assure you of my patriotism in signing myself

B.E.F.

SERGT. R.E.

#### AMBULANCE SIDECARS.

Sir,—Reading *The Motor Cycle* of September 6th, I was interested to note some criticisms and suggestions by "D.R." in his article on "Types of Machines," and as I happen to have had over two years in France on ambulance work, with every imaginable type of machine, from the roughly built ambulances of 1914 to the first-class ones of to-day, I venture to point out that the ambulance sidecar (?) outfit was tried, and found wanting, quite two years ago. I have ridden as a "patient" on a beautifully-built machine (designed by one of our best firms) over roads that were considered fairly good, and it was decided by universal consent that the idea was impracticable. As to light cars being used, how about the hundreds of Singers and Fords that are in daily use everywhere for every conceivable job, the Ford particularly being used for the sort of ambulance work "D.R." complains about? The French also use tiny little cars for their officers in charge of convoys of heavy cars to do their work of control. I suggest that the light car is used far more extensively than many people imagine.

Reading.

FAIR PLAY.

#### SIDECAR V. RUNABOUT.

Sir,—I have been much interested in the recent correspondence appearing in *The Motor Cycle*. As to the respective merits of three-wheel runabouts and sidecar combinations, I venture to add my quota to the discussion, as I have had a fair amount of experience with both. I have had 6 h.p. combinations of the latest type, with all refinements, etc., and to me it appears that the following defects are inherent in this type of vehicle:

1. Inadequate protection of the driver from rain, mud, and wind, and but few sidecars give protection to the passenger from wind and rain.
2. Insufficient insulation from road shocks, making speeds of twenty miles an hour or over very uncomfortable on rough roads.
3. Unsociability. With the passenger seated low down and to the rear, as is now the practice, it is difficult, to say the least of it, when travelling at any speed, to carry on a conversation.
4. The task of cleaning is one requiring considerable time and patience, all parts being so much exposed to mud and dust.
5. Then there is its instability in cornering, especially when the sidecar is empty. The side strain on the bicycle causes excessive wear on front wheel bearings and tyres.

I now have a Sporting Morgan fitted with M.A.G. engine, and to me it appears to have the following great advantages:

1. With hood and screen up, complete protection from the weather and mud, besides being much warmer in the cold weather.
2. More comfortable seat for the driver and insulation from road shocks, all wheels being sprung.
3. Greater protection of engine from mud and dust; much more easily cleaned.



4. Conversation can be carried on in ordinary tones at all speeds.
  5. Greater accessibility to working parts than the average combination.
  6. A smarter and more mechanical appearance.
- In speed and reliability it is no whit behind the best sidecar combinations; in fact, no 6 h.p. combination can touch it for speed and hill-climbing. It costs no more to run; I can do fifty miles to the gallon, and I find it lighter on tyres than a heavy combination. While it cannot compete in the matter of price with the light sidecar outfit, yet against the heavier twin-cylinder combinations, which are used always with sidecar attached, such a type of three-wheel runabout as the Morgan seems to me to offer incontestable advantages. I need only add that I have no interest in the Morgan Motor Co., save that of a satisfied user of one of their machines, and regret that at present military service forbids me enjoying more of the sport.
- H. CHAPMAN, Cpl.

#### THE PETROL POSITION.

Sir,—I read with interest a letter on the above subject in the issue of September 13th. I think it would be an eye-opener if others related all they know on this question. Within the last three weeks a friend of mine was offered six hundred (600) gallons of naphthalene a day, six days to the week, but the Government stepped in and stopped it. I was in a certain colliery district recently, and was informed that at one of the collieries they (the Government) had cancelled the order for benzole, and that this colliery was stocked out with it, as it was not allowed to sell without a permit. I could give several other instances like the above. The conclusion is forced on one that it is part of the policy of the Government to stop all motoring, and that being short of petrol is only an excuse.

Wigan.

A. BENNETT.

Sir,—I have a 6 h.p. Sunbeam combination, and am a colliery winding engineman working at Featherstone. Three months ago I was unable to find lodgings, and consequently had to return home to my parents to live; this is a few hundred yards short of ten miles each way from where I work, and the road is my only way of getting there. Of course, I selected the easiest way, *i.e.*, by motor. So I bought a good stock of solvent naphtha, and have run on nothing else the last twelve months. My stock has now run out. So recently I wrote for a permit to obtain some more, as it is only obtainable by permit now, though at the pit where I work there is plenty. I promised faithfully to use nothing but solvent naphtha, for I assure you the difference in the prices of naphtha and petrol would regulate that. But my promise was of no avail; I could not have any. On the other hand, the Petrol Controller wrote the same day asking a friend of mine (who happens to carry a N.M.V. card on his combination) to let him know how much petrol he requires for the next term.

Now I think it is time something was done in some way, for if the press would permit I could pass my opinion about the whole affair—for verbally I do.

Wakefield.

H.N.

#### TRENCHANT CRITICISM.

Sir,—I notice that occasional reference is made to the W.D. machines used in France. As I happen to have had experience with eighteen of these machines in the ordinary course of events, I am being continually reminded of their weak points. Practically 90% are Triumphs. While admitting that they stand the racket in a wonderful manner, I fail to understand why they are still fitted out in the same old way. Of course, we do not object to the material not being up to the usual standard, knowing that there really is a war on. Any improvements that have been made within the three years of experience are very slight.

The "new" handle-bars, fitted to give greater control over the steering, look very nice on a new machine until the time comes to handle them on the road. With the short head and lack of weight on the front wheel, one can usually make some very artistic circles and figures on the greasy pavé. However, after much jumping on, and with the assistance of a few D.R.'s, they can generally be pulled into a decent shape. When are we going to get decently-designed head bearings and a respectable length of head? Anyone who has ridden with an 8in. head will admit that it is far superior to the short type.

The wheels give the most trouble of any part of the machine. We still get the glorified push-bike type rim, instead of the sensible roundbase or S.M.M.T. As regards the hubs, I think it is about time they fitted the Douglas hub as standard to any W.D. machine. To be able to take the wheels out, without loosening the adjustment every time, is really worth consideration, apart from its wearing properties. Certain designs of hubs are too *hopelessly out of date* to be of any use out in France in the winter months. In fact, I have put new cups and cones into wheels, packed the same with stauffer grease and followed up with thick oil after every ride, and they last only three days. It is this design of hub bearing that necessitates the removal of the front brake from all new machines. Several riders have nearly taken "tosses" through the hub caps bursting, with the result that the brake pads foul the wheel spokes.

I must say that the engines stick it very well; the only weak points appear to be big end roller bearings and the tappet rods. The big end bearing design is, as practically all of us know, a copy of the very first type of roller bearing ever adopted. Owing to the small diameter of the rollers, they soon get flattened out, and any play there may be cannot be taken up by oversized rollers, as these are *not* issued—the only alternative being a plain big end bush substituted for the roller bearing.

Carriers have caused a great amount of trouble. Why not have carrier and stays in one, like the Scott, or a rigid affair like the Royal Ruby? Most of the mudguard fractures are caused through the carrier being of inferior design. I think if the manufacturers saw the way some of the carriers have to be patched up, they would design another.

The gear box is well assembled, but a little trouble is experienced with "jumping" on the second gear, which gives a peculiar motion to the machine. I think all riders have experienced this. As far as I can make out, it is due to end play in the main shaft, which is in turn imparted to the clutch worm, releasing the clutch plates (or rings, to be correct), causing the engine to race and then take up the drive, both actions occurring in a very short time. I have found that a gear box that has the above failing chews clutch worms up in a very short time, so there may be something in my discovery.

As regards the back brake. This is certainly a great improvement on the old type we had to put up with; but they might have finished the job while they were about it, and made the brake block compensating, the work of a few minutes in the actual works.

We are hoping to have a spring fork fitted one of these bright days. Wheelbase lengtheners are not exactly conducive to skidless rides, and it is not very healthy to hit a bump on dead centre. Still, this type of fork is better than the link type—where we get about a yard of play in the links and have to take it up with spring washers. I do not think there are many forks that are guaranteed to be free from side play, but I happen to know of two at present on the market.

There is quite a lot of talk about inverted levers nowadays, compared with the outside lever. The outside lever scores as regards accessibility—the thing we dream of. One knows where their cables are when one wants to get at them, and riders can invariably set the levers to their own liking on the handle-bars. With the inverted type, it is sometimes a conjuring trick, enticing little brass bushes through holes in the handle-bar lug.

I have had some experience with flat twins, namely, 2½ h.p. W.D. Douglas. The great failing with the machine appears to be with the gearing. Provided one can keep the "revs" up according to the load, one can usually make a fairly decent show. A four-speed gear box or infinitely variable gear, or a Philipson pulley would assist, and would make the machine into what I should call an "intelligent 'bus." In all cases, a hand-controlled clutch is absolutely essential. The absence of engine vibration seems to be its most valuable asset. It appears to me that machines like the A.B.C., with its outside flywheel, a *real* crankshaft, four speeds, and *clutch* leaf springing throughout, and up-to-date rear brakes, are the ones that will take the market *après la guerre*. It is such a change to see a decent engineering job, not a glorified push-bike.

All that I have said about W.D. models will, I think, be substantiated by other artificers serving "somewhere in France."

ARTIFICER.

B.E.F.



## THE SINGLE V. THE FLAT TWIN.

Sir,—Surely the "Two R.E. Lieutenants" are not to be taken too seriously. Fancy deciding the single v. flat twin issue by comparing the performance of the 2½ h.p. Douglas with two-speed gear only to the 4 h.p. Triumph with three-speed gear and handlebar-controlled clutch, especially as the top gear of the Triumph is no higher than that on a Douglas. It is simply ridiculous; but if the "two" concerned would have a fair comparison, then let them take the 4 h.p. Douglas three-speed solo and the Triumph, or place a sidecar on the Triumph and try it out against the first-mentioned machine. Perhaps these two "single" enthusiasts will tell me why, for sidecar work under active conditions, the 4 h.p. Douglas was the only small-powered machine considered powerful enough, and also why sidecars were not fitted to Triumphs. To me it is obvious that the Douglas type of engine, capacity for capacity and other things being equal, beats the single hollow.

W. F. BAXTER.

Sir,—From time to time we have followed the single *versus* horizontally-opposed twin controversy with a great deal of interest, and because the development of the latter type has been greatly due to our own efforts, we have deliberately refrained from taking an active part in the discussion. We are loth to do so now, but we feel the comparing of two distinctly different types and powers as the 2½ h.p. Douglas and the 4 h.p. Triumph—we mention the names, as it is obvious these are the machines under discussion—in the manner expressed by the "Two R.E. Lieutenants" in your issue of September 6th is hardly fair.

We wish to make no comment as to which type will ultimately survive; that, time alone must decide. But we would say that in designing the little 2½ h.p. Douglas it was never intended for competition with machines of the 4 h.p. class, even though otherwise on an equal footing. This, unfortunately, however, is not the case in the comparison the "Two Lieutenants" make, for, apart from the capacity being 200 c.c. smaller, the Douglas as purchased by the War Office, we regret to say, is the "1913" two-speed model, and although we have much advanced, and have entirely new models by us, the authorities prefer, rather than complicate the spare parts organisation, not to change over.

It must be remembered that the "single" supplied is of the "1915" class, with three-speed gear and clutch, and therefore, before any useful comparison could be effected showing relative merits of the two types of engines, it would be necessary to compare machines of about the same capacity and equipment. The 4 h.p. Douglas is about the equal of the 4 h.p. Triumph in these respects, and if both these machines were used for solo work a referendum, while not capable of deciding the matter, would be interesting. In the case as advanced by the "Two R.E. Lieutenants," however, it would only be a mere farce.

DOUGLAS BROTHERS.

Sir,—The "Two R.E. Lieutenants," whose letter I have perused in your paper of the 6th inst., have resurrected the single v. flat twin contention in an amazing manner, and have decided that this could be definitely decided by obtaining votes giving the D.R.'s opinion as to the relative merits of a 2½ h.p. twin and a 4 h.p. single. This suggestion, coming, as they tell me, from enthusiastic motor cyclists of much experience, borders on the ridiculous. How on earth any sensible comparison can be made, when one machine is of much greater horse-power than the other, is beyond me. The 2½ h.p. Douglas has done remarkably well, and in many cases has beaten machines of much greater power; but then it is only in the 350 c.c. class, and for the sake of deciding which design of engine is the better, it would be most unfair to handicap it nearly 2 h.p., which is just what "Two R.E. Lieutenants" wish to do: and, what is more, they throw in a three-speed gear further to assist the bigger engine. If it were possible to compare, under active service conditions, say the 2½ h.p. Douglas and the 2½ h.p. A.J.S., some sensible conclusion might result; however, as it is, it seems a mere waste of energy. I would advise the "Two Lieutenants" to try for their mud plugging and ploughing work a 4 h.p. Douglas solo, and then express an opinion as to which they consider is the better type.

I have tried all three, but the Bristol machine will ever be my choice, until the development of another or revolutionary engine.

R. C. HUDSON.

## AVERAGE SPEED.

Sir,—I venture to give my opinion of average speeds as a normal rider. Undoubtedly some people—expert amateurs we will call them—can knock up alarming speeds over long distances, but, as the "Critics" remarked, few 3½ h.p. machines can even touch 50 m.p.h. in the hands of any but professionals. Certainly 60 m.p.h. is getting towards track speed; even if one's machine will touch 50 m.p.h., few roads have a surface good enough and are safe for such a speed burst. The average long-distance rider who knocks up a 20-25 m.p.h. average has to shift 30-40 m.p.h. at every possible opportunity to make up for hills, towns, etc., and this, in my opinion, is fast time. A 30 m.p.h. average means 40-50 m.p.h. at every available opportunity, which calls for a spring frame (or springs behind combined with Terry links) on ordinary war-time main roads.

My three-speed 3½ h.p., of well-known make, top gear 3½ to 1, when humming along like a two-stroke, touches 45 to 48 m.p.h. I would not claim to keep this up for a long time—not a quarter of an hour—as one would want a twelve-mile stretch, with no danger posts, corners, hills, and slow-moving, obdurate carters. This speed to some, perhaps, is play, but all I can get from my touring machine, everything perfect, valves, combustion chamber scrupulously clean, timing, oil, first-class compression.

O.F.C.

Leiston.

Sir,—If the stories of correspondents who boast average speeds of over 40 m.p.h.—including one of nine miles at 54 m.p.h.—are true, which I doubt, all I can say is that such road hogs ought to be ashamed to boast of their hoggishness. These are the people responsible for the anti-motor bias, and who can wonder at it? In its turn this bias has done much to bring about the present prohibition.

I am sure we are thankful to them for their clever feat. If these gentlemen are George Washingtons, and not known by a Scripture name beginning with A, to maintain their average they must "blind" round corners and cross-roads, through village streets, and not only endanger their own silly necks (which matters little), but the lives of little children also.

I drive an 8 h.p. combination. I do not dawdle, but on a cross-country run, slowing for corners, cross-roads, village streets, and down steep hills, I find that I have to move quite decently to average 20 m.p.h. for the whole distance, even when maintaining 25 to 30 m.p.h. on all straight bits. I can do 45 m.p.h. with sidecar and 55 m.p.h. solo, but I never try a real speedburst unless it is an exceptional bit of clear country road, such as one seldom finds, because I like to observe the decencies of the road and the old-fashioned golden rule. Whoever averages more than 20 to 25 m.p.h. sidecar, and 25 to 30 m.p.h. solo, on a long cross-country journey, must be guilty of road-hogging.

I only wish, by the way, that the gentlemen who get 75 m.p.h., to quote one, from a machine on the road would tell me where they find the plugs that stand it.

London, S.E.

ZENO.

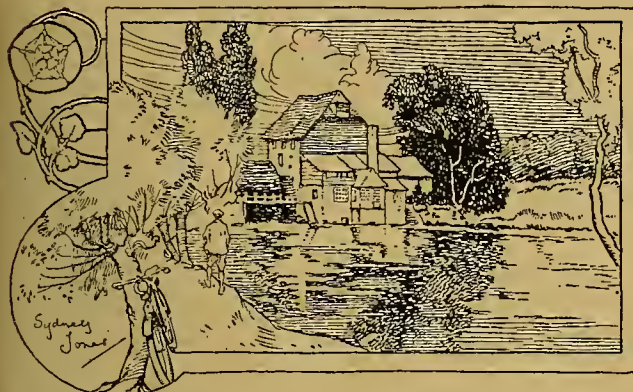
Sir,—I have just been reading "Occasional Comments" in *The Motor Cycle* of August 2nd, 1917, in which "Ixion" quotes the A.B.C. when dealing with the subject of average speeds. I heartily endorse his comments on the high average speed which this machine is able to maintain; but I should also like to assert that it can hold its own with any 3½ h.p. on the road in a "straight blind."

In March, 1915, I bought an ordinary touring 3½ h.p. four-speed spring frame A.B.C., and rode it 10,000 miles, during which time I was able to show my heels to anything, barring an aeroplane. On four separate occasions I rode from Newcastle-on-Tyne to Chertsey in Surrey, a distance of 300 miles, inside ten hours; climbed any number of freak hills, including the side of a slag heap with a gradient of 1 in 1.9, which it accomplished from a standing start; touched 55 m.p.h. with a heavy sidecar and passenger, and finished up by winning *The Motor Cycle* Cup on Brooklands, at the United Services Meeting, for the greatest number of wins, in which it was competing against stripped racing 3½ h.p. and 7 h.p. machines of all denominations.

I have not yet heard of any other machine which is capable of repeating this programme, and, until I do, I shall maintain that the only perfect machine for all purposes is the 3½ h.p. A.B.C.

H. GRAHAM-HODGSON, Capt. R.A.M.C.





## IN PICTURESQUE HAMPSHIRE.

### A RUN THROUGH WINCHESTER AND THE NEW FOREST.

I HAD intended to make an early start, but "the best laid schemes o' mice and men gang aft a-gley," and it was nearly nine o'clock ere I was ready for the road. It was certainly rather foolish to wait for the morning post, for I might have known that my wife, who had been at Barton with the children for a week, would have several commissions for me to execute. Sure enough, the keynote of her letter was, bring this and bring that, and by the time I had collected together the various articles they made a formidable pile. The long tandem-seated sidecar to which my 7-9 h.p. Premier twin was mated, already contained my own luggage and a typewriter, and these extra things just about filled it up. As a protection from dust and possible rain, I covered the luggage with a white waterproof sheet, and the effect was suggestive of taking home the washing.

I was bound for Barton, on the Hampshire coast, to join my people for a short time, and as the place was on the border of the New Forest, we were looking forward to some pleasant little motor trips in company with my brother and his wife, who were coming over in their two-seater car to spend a few days with us.

It had been raining overnight, and the roads were still wet when I left my house at Woking, but they were drying rapidly under the heat of a blazing sun, and by the time I reached Guildford the going was excellent. Past experience warned me to give the more direct road through Bagshot a wide berth, as the surface was, and, I believe, still is, something like the North Sea on a breezy day, so I decided to go *via* the Hog's Back.

#### Over the Hog's Back.

There are few more picturesque high streets than that of Guildford, with its venerable grammar-school, the *alma mater* of Archbishop Abbot, and the fine old hospital that bears his name. Once clear of the town and one can indulge in a fine burst of speed over the Hog's Back to Farnham, although the surface is certainly rougher now than in pre-war days. From Farnham, through Crondall and Odiham, to Basingstoke, the scenery is delightful, and I know of no prettier lanes in all Hampshire.

Just as I was entering Basingstoke the speedometer struck work, and on investigation the cable proved to be broken. I was not altogether surprised, as it was an old one transferred from my last machine and had run some six thousand miles. Speedometer

cables cannot, like Tennyson's brook, be expected to go on for ever. I stopped at a garage for a spare link, but there was not one in stock. I was provided with an old cycle spoke, however, from which I contrived to make a new link. This delayed me for the best part of an hour, but I was able to make up some of the lost time between Basingstoke and Winchester, as the road was in splendid order. There is nothing more exhilarating than driving a powerful motor cycle at speed over a perfect road, and those eighteen miles were sheer joy. It would not perhaps be prudent to mention the speed at which they were covered, but anyhow, in spite of the delay at Basingstoke, I arrived at Winchester far too early for lunch. Putting up at the "Black Swan," I ordered lunch in an hour and went off with my camera to see the Cathedral.

#### In the New Forest.

Winchester is fortunate in the possession of one of the finest cathedrals in the kingdom, but most of the principal objects of interest are placed at the chancel end behind a barrier which can only be passed on payment of sixpence. Although the charge in itself is trivial, it does not strike one as being altogether decent to place the chancel of a church on the same level as the chamber of horrors at Madame Tussaud's. Leaving the Cathedral, I strolled back to the hotel by way of the famous old school, where I snapped a photograph of the ancient gateway, and incidentally of two Wykehamists sitting in their shirt sleeves at small tables in the courtyard, doing their "prep."

After lunch I resumed my journey, following the Southampton road for ten miles before turning off through Redbridge and Totton to Lyndhurst. I had been led to expect loose and flinty roads in the New Forest, but was agreeably surprised to find them excellent. When I had previously visited this district it had been in the autumn when the tints were at their best, but the Forest seemed equally charming in May. From Lyndhurst I followed the Lymington Road as far as Brockenhurst, and then my way lay through a series of pretty lanes. I ultimately reached my destination in time for tea after a particularly pleasant trip of rather more than eighty miles.

My brother arrived on his car the following day, and we spent a week exploring the Forest and surrounding country. Our trips were, for the most part, quite short, as we usually passed the morning on the beach, but the weather was gloriously fine, and it was very jolly pottering about in the Forest and having tea *al fresco* under the magnificent beeches. Perhaps the Forest is seen at its best on the Bournemouth road between Lyndhurst and Hinton St. Michael. The



**In Picturesque Hampshire.—**

beeches there are the finest I ever saw. Out of curiosity we roughly measured the trunk of one and found it to be seventeen feet in circumference. This was one of our favourite tea venues, for although rather close to the road there was comparatively little traffic. An occasional Bournemouth char-à-banc went by, and on one occasion, whilst having tea, we were amused at hearing the guide shout through his megaphone in stentorian tones, "Picnic in the New Forest; an everyday occurrence." It seemed strange to be pointed out as objects of interest to a crowd of trippers, but as Malvolio says in the play, "Some have greatness thrust upon them." Hinton Admiral, with its quaint old "Cat and Fiddle Inn" and picturesque post office, marks the end of this delightful stretch of road, for from there on to Bournemouth the scenery is nothing out of the ordinary. Christchurch, however, is not without interest, as the old abbey is a fine building that is seen at its best from the bridge over the river as one enters the town.

**Some Delightful Jaunts.**

One of the most delightful trips in the Forest is to Beaulieu and Buckler's Hard, by way of Lymington. The scenery is quite charming all the way, and the gorse on Beaulieu Heath something to remember. As far as the eye could see the heath was one blaze of flaming yellow, but the road for once in a way was very loose and flinty.

Although most delightfully situated the Abbey of the King's Beaulieu is, as a ruin, rather disappointing, for of the greater part of the buildings nothing remains but portions of the foundations and some pavement. But the Domus, restored by Lord Montagu, is a fine room, and the old Refectory, now used as the parish church, is interesting. Perhaps the chief charm of Beaulieu is the tidal mill situated on the weir, although the country everywhere in this neighbourhood is very beautiful. The scenery on the river is not unlike that of the Dart, and is particu-

larly charming at Buckler's Hard, a few miles below Beaulieu. It is, however, seen to best advantage from the deck of a yacht, and in the course of five and twenty years' yachting I have never struck a more enchanting anchorage.

**Wet Tar and a Puncture.**

Another trip that sticks in my memory was to Sandbanks, a little bungalow settlement on the sandy spit that marks the entrance to Poole Harbour. This run was impressed upon my mind, I think, by the fact of my brother having one of his tyres punctured. Under ordinary circumstances a puncture is not of much account, but this happened on a stretch of road that was being tarred, and the tar was wet and uncovered.

As a result the tyre, which for my sins I had to help him repair, was covered with wet tar, and ere the job was completed our hands were in like state. I then made an amazing discovery. Plucking some grass from the roadside I rubbed my hands with it, and in next to no time every trace of tar was removed. Whether the grass in the neighbourhood of Christchurch possesses peculiar tar-removing properties I cannot say, but I shall certainly try the experiment again should occasion arise.

At the end of the week I returned home, taking two of the children in the sidecar, thereby saving railway fares, and incidentally beating the train by some hours. We returned by much the same route as that by which I went, but, going through the lanes from Basingstoke to Odiham, we happened upon Mapledurwell, a most delightful little village of old-world timber-framed cottages with thatched roofs. We called a halt for lunch by the roadside, and some pretty little girls in old-fashioned pinafores playing on the green seemed in such perfect keeping with the surroundings that I took a photograph of them to keep as a memento of this charming Hampshire village.

FRANCIS B. COOKE.



(2) Picturesque cottages at Mapledurwell.

(1) Cat and Fiddle, Hinton St. Michael.

(3) Post Office, Hinton St. Michael.

(4) Winchester Cathedral from the Close.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## Lubrication.

(1.) What is Oildag, and will it improve the running of a 4 h.p. Triumph and sidecar? (2.) Can you recommend the 1916 Triumph carburetter for fitting to a 1914 Triumph, now having an old type of Triumph Company's own carburetter.—W.R.M.

Oildag is very fine graphite in suspension, and can be safely used in a 4 h.p. Triumph and sidecar. Provided it is employed according to the makers' instructions, it should improve the running of the engine and prevent the piston from gumming up. (2.) We should say that the 1916 Triumph carburetter could be an improvement, but alterations of this nature are not always worth while.

## Excessive Sparking at the Platinum Points.

For the last twelve months I have been having some very peculiar trouble with the platinum points of my magneto. In five miles riding the points corrode so badly that the engine misses, and finally stops firing altogether. A squirt of petrol between the points remedies the defect at once, and the magneto is then good for another five miles or so, *ad infinitum*. On long country runs one "priming" is good for ten or twelve miles, the distance I am able to travel on one priming being in direct proportion to the speed at which I am travelling. I have asked every electrician and magneto company on this side of the water that I know, but none of them seem to be able to tell me the reason why the points should corrode so quickly. I have used up several different sets of good new points, and have even equipped an entire brand new interrupter complete, but the same old story—after a few miles the points corrode again and the engine misses and stops. I have even fitted a new condenser, with no success. At present I am running the machine on the two nuts which hold the platinum points, without any platinum at all, and find that the steel does not corrode quite so quickly. Can you throw any light on this matter?—CANADA.

We are of opinion that the trouble is due to a fault in the condenser. Even if you have fitted a new condenser the connections may be poor. If, however, you are thoroughly satisfied that the condenser and its connections are in order, then it is evident that you have been supplied with impure platinum.

## Running on Mixed Fuel.

I have a motor bicycle fitted with a 2½ h.p. J.A.P. engine, and I wish to fit it up to run on substitute. Will you please answer the following questions, as I never act without your advice?

(1.) The machine will start from cold and run on a mixture of half petrol and half paraffin. Do you think it will harm the engine to any great extent to run it thus? (I have only run it a few hundred yards on that mixture.) (2.) Shall I obtain fair results on pure paraffin, if the fuel is heated before it reaches the carburetter, and again before it reaches the cylinder? (3.) Will a mixture of half petrol and half paraffin vaporise properly? I am told this is not satisfactory, as it does the petrol harm to heat it.—C.B.

(1.) This will not harm the engine, provided you use a good brand of lubricating oil and plenty of it. (2 and 3.) You could obtain fair results on pure paraffin, but a half and half mixture is, of course, much better. It is necessary to heat the air intake, and very often the fuel as well. A mixture of half petrol and half paraffin will vaporise under heat, but without heat it will not run the engine satisfactorily, and is likely to damage the bearings.

## Timing a Four-cylinder.

I should be glad if you can answer the following questions regarding an F.N. four-cylinder motor cycle which I have bought:

(1.) What opening and what size of compression spring should I use on inlet valves which are automatic? (2.) Is there any different setting of exhaust valves from any ordinary engine? (3.) What type of new carburetter would you recommend? I should like to say I am experienced with motor cycles, but have never had an F.N., and I have fitted this machine up as I thought best, but cannot get good results at all. If it is possible to convert the machine into mechanical valves I should like to do so.—J.H.

(1.) The opening should be about 3/32 in., and the spring should be so arranged that when you shake the valve in the hand violently it only just opens. (2.) The exhaust is timed so that it opens when the piston is about 8 mm. from the bottom of the firing stroke, and is closed when the piston reaches the top of the exhaust stroke, and not before the top. (3.) Probably an automatic carburetter, such as a Claudel or a small model Zenith,

would give more power and greater flexibility with this particular type of engine. The conversion of the machine to mechanically operated inlet valves would be a difficult matter; and, though this has been done, we doubt whether it could be satisfactorily achieved by any but a skilled mechanic having a well-equipped workshop.

## Pre-ignition.

My son has a 2½ h.p. F.N. lightweight. I do not know the date, but am told it is at least six years old. The machine, however, has done very good service to him while in training, and he left it here last year on going to the Front. It has just lately developed a defect which I cannot trace. It starts up easily, runs for about half a minute, and then suddenly stops. It does not labour or knock out, but just shuts down as if the magneto were switched off or the throttle closed. It does this with unfailing regularity, but will start again almost at once, and do the same in another half-minute. The magneto (a Bosch) is in perfect order. It was taken off, put on the lathe, and run at all sorts of speeds, and it sparked most vigorously. The petrol pipe is clear, and the carburetter (an automatic, single-lever) has been repeatedly overhauled. The high-tension cable is all right. To make sure, I ran an extra copper wire through a piece of gas tubing from the magneto terminal to the plug. The induction pipe has the joints packed to eliminate air leaks. Can you suggest a cause for the sudden stoppages? The engine is fairly clean, and there is plenty of lubricant. I may add that when the engine is started up on the stand it does exactly the same, viz., runs for about half a minute, and then suddenly shuts down.—W.F.A.E.

The trouble would appear to be due to the use of a sparking plug the points of which become incandescent and cause pre-ignition. We should recommend you to change the make of plug, fitting one of the two or single-point variety with substantial electrodes. Make sure, while at it, that petrol is reaching the carburetter at a regular flow. Next time the machine stops turn off the petrol, and examine the level in the float chamber. If it is almost empty, this indicates air lock or some other impediment in the petrol pipe. We think that a new plug will probably eliminate the fault, but if not the magneto should be taken to pieces and thoroughly cleaned and dried.



### Acetylene as Fuel.

**Q** The letter from Mr. McAdam, of Liverpool, a week or two ago, "Why not Acetylene," reminded me that I tried about six years ago to run a two-stroke motor cycle engine on acetylene gas, but I had poor results, the explosions being too strong, and the engine became very dirty with black deposit after a few hours' run. I think I have found the way of reducing the strength of the explosions: anyhow, I am going to try to run my motor cycle on it. Could you tell me: (1.) How to purify this gas? (2.) Would dissolved acetylene be purer? (3.) Is it possible to get D.A. cylinders during the war? (4.) If the worst happened, what may I expect? Would the explosion be strong enough to smash the cylinder of a  $3\frac{1}{2}$  h.p. four-stroke engine, or would it only break the connecting rod?—FRENCHMAN.

(1.) The only way we know of is to pass the gas through a filter consisting of a small chamber filled with horsehair. (2.) Undoubtedly dissolved acetylene would be purer. (3.) But there might be some difficulty in getting D.A. cylinders at the present time; in fact, we fear that they are unprocurable. Also, it is practically impossible to get carbide. (4.) The worst of acetylene is that it is very uncertain in its action. An engine may run perfectly well on many occasions, and yet perhaps on one occasion you might have a violent backfire, breaking the connecting rod and smashing the piston, or even bursting the cylinder.

### Renovating an Old Machine.

**Q** I have recently come into possession of a 4 h.p. Ariel motor cycle, fitted with a variable pulley. I can change it from  $6\frac{1}{2}$  to 1 to 4 to 1. It has accumulator ignition. The date of the motor cycle is about 1909 or 1910. I am informed that it used to have a forecar attached. What I would like you to tell me is: (1.) Would it take a sidecar, and what gear should I use with it? (2.) How far or how long would an accumulator last without being recharged? I mean to have two—one in use and another ready for use—but I would also like to have an idea as to the length of service I could get from each without recharging. (3.) I was thinking of fitting a new carburetter with Bowden control—at present the carburetter is operated by levers. Are all carburetters of the same dimensions? That is, will they all fit on to the cylinder, or is each make of a different size or thread? I have had the machine some time now so am making some little alterations, which I expect to be improvements, while it is lying idle owing to my inability to procure petrol.—J.D.B.

(1.) The machine in question would take a light sidecar. The top gear should be about  $5\frac{1}{2}$ -6 to 1. (2.) An accumulator should run about 500 miles without needing to be recharged. Accumulators work most erratically, and sometimes give up quite suddenly without any warning. Accumulator ignition is most unreliable, and a magneto if fitted would save you endless trouble. The machine,

we should say, would be a good deal earlier than the date stated in your letter. (3.) Carburetters are sometimes designed with different size inlet pipe fixings, so in ordering a new carburetter the type, size of inlet pipe, and nature of fixing should be mentioned.

### Misfiring.

**Q** I shall be much obliged if you can assist me in locating the misbehaviour of my 1914 4 h.p. Triumph. Running at, say, 15 to 25 miles per hour, it goes perfectly for about a mile (perhaps two), when it will suddenly misfire for perhaps ten revolutions, go on again, misfire a little more, and then run perfectly until the misfiring starts again. Sometimes the engine will not misfire for periods of three miles, and at high speeds it rarely occurs, but has done so occasionally. The machine has run about 2,000 miles like this. I have not had time to go over it until now, when I find the following: The rocker arm appears quite free, as on turning the engine over by hand the points make and break contact regularly. The points separate the thickness of a visiting card, and do not appear to be pitted. The carbon brush and slip-ring are quite clean. The high-tension wire seems all right. The carburetter is quite clean, and the petrol pipe clear, but I have not examined the inside of the tank. The air hole in the filler cap is quite clear. Petrol only is used. The valve springs are of the required strength. The plug is a Sphinx—one of the latest. The machine will not run slowly, although there appear to be no air leaks. The air and throttle pistons are held quite firmly, and do not jump about. The carburetter is a Triumph semi-automatic. The level appears to be all right, and a standard jet is used. The trouble frankly puzzles me, as I have ridden for a few years now. Perhaps you can assist me. In other respects the machine is perfect, and has plenty of power and speed, and gives no cause for complaint whatever, other than the above.—G.L.

The trouble of which you complain is very puzzling to anyone who has not had an opportunity of seeing the machine. It might possibly be due to water in the petrol system, or to some temporary obstruction blocking the orifice of the petrol pipe in the tank. It is curious that the engine will not run slowly, because it should certainly do so with a standard jet. This leads one to suppose that the petrol supply is restricted in some way or other. Make quite sure that the rocker arm is quite free. There may be just enough bind to cause sticking at intervals. We presume you have tried a change of plug.

### READERS' REPLIES.

#### Lubricating the Chain.

We notice in your issue of August 30th a query with regard to the best method of lubricating driving chains on motor cycles. We consider your suggestion excellent, but would call attention to the fact that the actual parts of the chain

requiring oiling are the extreme outsides, and the wick should spread sufficiently to overlap the outside links, and so enable oil to get in between the actual bearing surfaces. The centre part of the chain scarcely requires any oil, though it is usually this part that gets oiled most. We prefer, whenever possible, to apply oil to the inside of the drive, so that centrifugal action will help to take the oil where required, and not merely throw it off, as will be the tendency when applied outside. One or two makers are leading a pipe from the release valve of the crank case to the chain, so that any leakage may be made use of. The oil is delivered in the form of a spray, and we have found the results excellent. Unless the chain is really thoroughly lubricated, it pays to remove it from time to time and clean and lubricate it. Unless a chain runs in an oil-bath, it is difficult to prevent water getting into the joints, which will, of course, prevent oil getting in subsequently.—HANS RENOLD, LTD.

### A Flat Twin on Heavy Fuel.

If your correspondent's machine is a 1917 6 h.p. Humber my experience with a similar one may be of interest to him. It was impossible to get a correct mixture with either war petrol or petrol plus substitute with the Longuemare carburetter fitted. A large jet overcame the popping back when accelerating, but gave too rich a mixture at speeds with smoky exhaust. I removed the carburetter, and fitted a Zenith 22 with 13 choke tube and 65 main and compensating jets, and took out the centre bolt of silencer, drilled the end castings to take in. pipe, and connected up to the carburetter with copper flex. A water-jacketed induction pipe would be a great improvement, and in reply to a suggestion to the makers that they should supply me with one, they wrote that they were experimenting with one, but could not offer one at present as they were controlled. There should be no difficulty in supplying the necessary heat to a jacket by a shunt from the water outlet to water inlet of the cylinders, thus short-circuiting the radiator. If I can help your correspondent in any way I shall be glad to do so.—S.J.R.

### RECOMMENDED ROUTES.

#### BURNHAM-ON-SEA TO BOURNEMOUTH.—A.R.

Burnham-on-Sea, Wells, Shepton Mallet, Bruton, Shaftesbury, Wimborne Bournemouth.

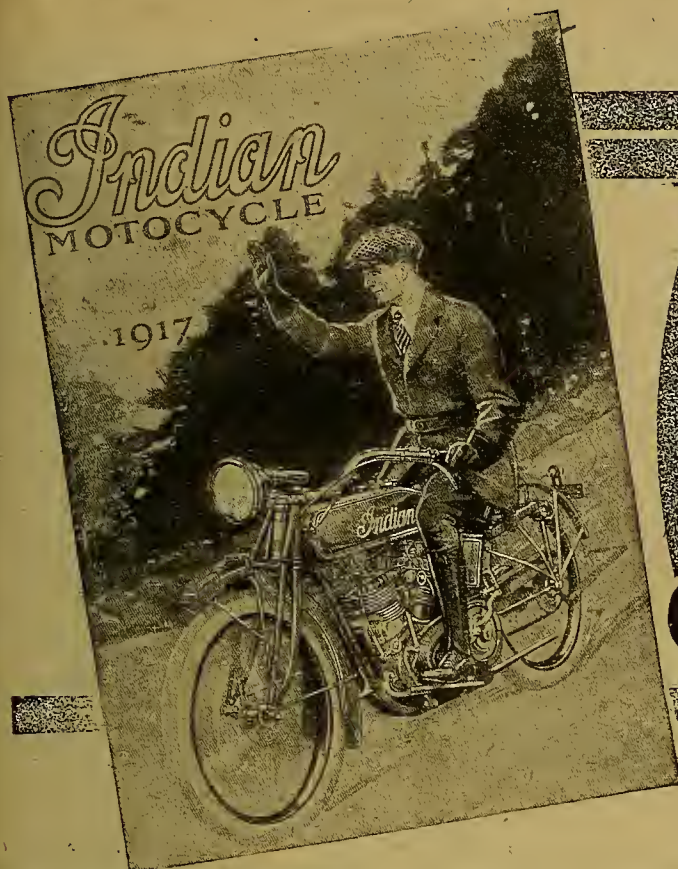
#### BRISTOL TO BOURNEMOUTH.—Sgt. G.

Bristol, Bath, Beckington, Warminster Longbridge Deverill, Shaftesbury, Blandford, Wimborne Minster, Bournemouth. There are several routes, and not much to choose between them, but we are inclined to recommend the above.

#### BIRMINGHAM TO TORQUAY.—E.M.

Birmingham, Alcester, Evesham, Teddington, Cheltenham, Painswick, Stroud Nailsworth, Bath, Marksbury, Chewton Mendip, Wells, Glastonbury, Othry Taunton, Wellington, Cullompton Exeter, Torquay.





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170



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd., and crossed** & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### A.B.C.

**A.B.C.**, 1915-16, one of latest models and machines sent out, little and carefully used, equal to new throughout; highest offer; 15 gallons petrol given.—Box 14,499, c/o *The Motor Cycle*. [7966]

### Abingdon.

**ABINGDON K.D.**, 1912, 3 1/2 h.p., single speed, new tyres and wheels, good running order, and fast; £19, or nearest offer.—23, Glenholme Terrace, Lumsley Rd., Redcar, Yorks. [X5360]

### A.J.S.

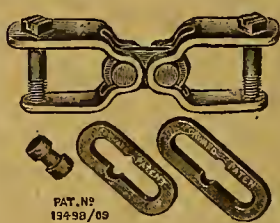
**LATEST A.J.S.** 6 h.p. Combination, fully equipped, not done 3,000; £160, or offers.—15, Harling Rd., Preston, Lancs. [X5425]

**1912 5 h.p. A.J.S.** and sidecar, 2-speed countershaft, kick start, good condition; £40.—Graves, Chester, Leamington. [8027]

**A.J.S.** 1914 6 h.p. Combination, hood and screen; £77/10.—Lamb's, -151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8206]

**A.J.S.**, 2 1/2 h.p., December, 1915, 3-speed, hand clutch, kick starter, lamps complete, speedometer, tools, machine perfect throughout; £40.—Solomon, Pyramides, Stanmore. [8114]

**A.J.S.**, 2 1/2 h.p., 2-speed countershaft, clutch, E.I.O. mag., Amac, Brooks, good tyres, enamel and condition generally good, chain drive; £22, or near.—20, Church Hill, Aldershot. [7972]



The "Forward," 1/6.

Don't take chances—little details neglected mean big failures, but the

## FORWARD

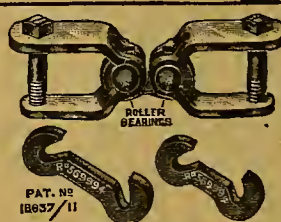
fasteners never fail, and render the maximum amount of service.

By them you are assured of freedom from the many annoying stops on the road for readjustments and repairs.

Ask your Agent for particulars and us for catalogue.

## Forward Motor Co.,

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Detachable, 1/- Adjustable, 1/3.

**THE ZILLA ALL WEATHER BELT**  
No Slip More Power, Less Petrol, No Fastener Required.  
**SPECIAL TRIAL OFFER:**  

11in.	12in.	13in.	14in.	15in.	USUAL PRICE FOR 8 FEET.
24/-	26/-	28/-	30/-	32/-	

**PLUS 8d. POSTAGE. LENGTH UP TO 8 FEET.**  
 The Zilla Belt is suitable for all classes of machine and specially for Gradual Gears. All sizes, from 2 1/2 h.p. to 12 h.p.

**The ZILLA MOTOR ACCESSORIES Co.**  
(J. NOEL SCHOLEFIELD, PROPRIETOR)  
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Bringing of useful information.

Price 1/6

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## MOTOR CYCLES FOR SALE.

### A.J.S.

**A.J.S.** Spares; prompt delivery.—Cyril Will Chapel Ash Depot, Wolverhampton.

**1914 A.J.S.**, 6 h.p., 3-speed, and clutch, combination with large business sidecar, all in excellent condition; £60.—Hopkins, New St., Ledbury.

**A.J.S.**, 2 1/2 h.p., 1914, 3-speed, clutch, T.T. bar and H. head lamp and generator, rear lamp, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.1.

**A.J.S.** 1914 6 h.p. Combination, splendid condition, 3 speeds, kick starter, tyres as new, wind up and luggage carrier, lamps, etc.; £65.—Winstanley, Ormskirk Rd., Pemberton, Wigan. [X]

**1915 4 h.p. A.J.S.** Combination, clutch, kick start, 3-speed, hood, screen, Binks carburettor, chamois horn, speedometer, mileage 3,750; £70; 10—Horsfield, 159, Rochdale Rd., Firgrove, Rochdale. [X]

**A.J.S.**, 2 1/2 h.p. (1915), with 3-speed countershaft gear, clutch and kick starter, engine overhauled, tyres in good condition; £47/10; extra payments arranged.—Harrods, Motor Showrooms, Brompton Rd., London, S.W.7.

**A.J.S.**, late 1916, 6 h.p., and De Luxe sidecar, 3 speeds, 3 lamps, spare wheel and unused tube, screen, apron, tools, etc., used only for sun and perfect condition before storing; sell £21 Letter, 57, York Rd., Southampton.

### Alldays.

**COLMORE Depots**, Birmingham and Manchester immediate delivery of Allon 2-strokes.

**1916 Alldays-Allon**, 2 1/2 h.p.; £20.—Elee and Co., 16, Bishopsgate Av., Camomile St., E.C.3

**ALLDAYS Allon**, 2-speed, splendid condition;—W. and H. Motor Co., Ltd., 287, Deans Manchester.

**RIDER TROWARD and Co.**, 31 and 78, High Hampstead.—Alldays Allon, 1916, 2-speed stroke; 27 gns. (1)

**ALLDAYS Matchless**, 3 1/2 h.p., 3 speeds, countershaft combination in nice condition; £38.—Percy Co., 337, Euston Rd., London.

**NEW Allons**, 1917 models, 2-stroke, countershaft speed gear; £42; 2 1/2 only charged for extended months.—Wanchop's, 9, Shoe Lane, London.

**ALLON**—Medical man joined H.M. Forces, wish dispose 2 1/2 h.p. 2-speed Allon, new 18 months suit medical man.—Astley House, Bolton, Lancs. [X]

**ALLON**, 1916, 2 1/2 h.p., 2-stroke, 2-speed, clutch, used, excellent condition, mechanical horn, to see any time; £37.—Hogg, Cedars, Rickmansworth.

**1916 Allon**, 2-speed, runs on paraffin, £26; Tri engine, 1909, good running order, 80/-; W frame, tank, etc., 40/-.—Jesse Hall, Music Seller, 1

**1917 Alldays Allon**, 2-stroke, nearly new, mileage countershaft chain-cum-belt drive; great but for quick sale, £28/10.—Green, 3, The Mews, Vic Rd., Clapham, S.W.

**ALLON**, new, 2 1/2 h.p., 2-stroke, single speed; £39 the stout-hearted lightweight; extended months arranged.—Harrods, Motor Showrooms, Brompton Rd., London, S.W.1.

**1916 (June) Allon**, 2-speed, special machine, driving chain, heavy back wheel, footrests, a tank for heavy fuel; illustrated motor cycle News 10th; price £30.—80, Radford Rd., Leamington. [X]

**ALLON**, 1915, 2-speed, 2-stroke, pan saddle, 23; single speed (new), £36; 2-speed, new, £42; 2 and hand clutch, new, £45; extended payments or change.—Alldays Allon, 1915, 2-speed, Dunlop camelline and plotting good, £30/17/6.—Service 292, High Holborn. [X]

### Ariel.

**1915 Ariel** Combination, 6 h.p., new condition; 2 Ross, 86, High Rd., Lee.

**ARIEL**, 3 1/2 h.p., 1917, 3-speed countershaft machine in stock.—Crow Bros., Guildford.

**COLMORE Depots**, Birmingham and Manchester, pool and Leicester, for all models of Ariels.

**FOR Sale**, 3 1/2 h.p. Ariel, good condition; very cheap. Apply, The Gardener, Doricourt, Kingston Putney. [X]

**1917 Ariel**, 3 1/2 h.p., 3-speed countershaft combination, 3 lamps, 3 generators, horn; £80.—S. G. Norfolk War Hospital, Norwich.

**ARIEL**, 2 1/2 h.p., single, Bosch, B. and B. P. an lamps, tool set, good condition; £16, offers.—L. Cochrane, Boreham Wood, Herts.

**ARIEL**, 3 1/2 h.p., about 1911, good running Saxon, Bosch, B. and B. P. all, tyres good, back, new belt; offers.—C.F. 37, Clarence Rd., Teddington. [X]

**ARIEL**, 1915, 3-speed, and clutch, 5 h.p., sent pillar, Dunlop tyres, hood and screen, 1 lamp and Cowey speedometer; £71/15; extended months or exchange.—Service Co., 292, High Hol London. [X]



# MOTOR CYCLES FOR SALE.

**Ariel.**  
EL (new), 3½ h.p., 3-speed countershaft gear, clutch and kick starter, decompressor, patent seat pillar; £72; extended payments arranged. Motor Showrooms, 118, Brompton Rd., S.W.1. [8136]

**Arno.**  
p. Arno, 3-speed Armstrong hub gear, good order; £20.—Jones' Garage, Broadway, Muswell Hill. [8069]

**A.S.L.**  
L., 1914 model, 4½ h.p., Precision, enclosed Bosch, 2 speeds, fine sidecar machine; £25; easy terms arranged.—Wandsworth Motor Co., Ehner St., Wandsworth (Town Station). [8086]

**Auto-Wheels.**  
O-WHEEL, good running order, new tyre; £7/10. Day, Bond St., Nuneaton. [X5373]

**Bat.**  
5 h.p. Bat-Jap Combination, 2 speeds, faultless condition; £28.—Write, Nash, 45, Clifton Gardens. [7974]

**J.A.P. 8hp. Two.** coachbuilt castor wheel sidecar, 2 speeds, kick starter, good tyres, speedometer, head light, enclosed Bosch; owner going Overseas £29/10 quick sale.—Box L4,529, c/o The Cycle. [8063]

**Bradbury.**  
2 Bradbury, recently received, in fine order; £21.—Cross, Jeweller, Rotherham. [X5478]

5 Bradbury, 4h.p., Bosch waterproof, Amac; bargain, £12.—325, High Rd., Leyton, E.10. [7969]  
1 4h.p. T.T. Bradbury, re-enamelled, and perfect; £16.—Twitcheit, 147, White Hart Lane, Barnes. [7960]

**DBURY.** 1912, 3½ h.p., 2 speeds, chain drive, free engine; £25/10.—Motor Exchange, Horton Road. [8030]

**DBURY and Sidecar.** 1913, 4h.p., 2 speeds, perfect, must sell; £30.—17, Manor Park Parade, Ed., Lee, S.E. [8093]

**DBURY.** 4h.p., single-cyl., free engine and clutch, good tyres, Amac carburettor, slight re-Bosch mag.; bargain, £15.—A.M., 3, Ruskin Rd., Sussex. [8101]

**ER TROWARD and Co.**, 31 and 78, High St., Hampstead.—Bradbury, 1914, 4h.p., 2-speed shaft, coach sidecar. 39 gns.; 1912 single speed 17, 16 gns. (D) [7429]

**DBURY Horizontal Twin.** 3½ h.p., 3-speed countershaft gear, hand clutch, all chain drive, as latest model; £55, or exchange.—136, Lavender, Southfields, S.W.18. [8079]

**Brough.**  
ER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 Brough, latest model horizontal twin, Sturmeys countershaft gears. condition; 59 gns. (D) [8235]

**Brown.**  
W.N., 3½ h.p., just overhauled, perfect order, mag., footboards.—Hills, Brooklands, Boreham. [8158]

p. Brown, N.S.U. 2-speed, in fine order; £22.—Jones' Garage, Broadway, Muswell Hill, N.10. extended payments arranged. [8068]

**B.S.A.**  
A., 4½ h.p., 3 speeds, brand new, with speedometer; £66.  
A., 1916, 4½ h.p., 3 speeds, all chain drive; £58.

A., 1916, 4½ h.p., 3 speeds, combination; £65.

A., 1915, 4½ h.p., 3 speeds, all chain drive, combination; £58; exchanges and deferred payment.—Percy and Co., 337, Euston Rd., London. [7571]

**MORE Depots** 261, Deansgate, Manchester, for immediate delivery of B.S.A. [80798]

A. 1914 Model K, 3 speeds, chain-cum-belt drive; £34.—Martin, Yew Tree Cottage, Armitage, Staffs. [X5486]

A., 3½ h.p., 1912, free engine, with T.T. handlebar, excellent order; £26.—Eagles and Co., High Ct., W.3. [X5460]

A., 1912-13, 3½ h.p., free engine, clutch, excellent condition, in running order throughout; £22.—F., Two Gates, Cradley, Staffs. [X5429]

**UTIFUL B.S.A. Combination.** 1916½, splendid condition; cost £97, what offers?—Stanley, 43, Cliff Rd., Charlton, London, S.E. [7601]

A. Combination, 1917, good as new, a grand lot; £70, lowest; take good lightweight in part.—Bunt-Motor Exchange, Masons Av., Harrow. [8209]

A., 1913, 2 speeds, in splendid order, very little used, just overhauled thoroughly by B.S.A.; any £34.—Telford Garage, 47, Streatham Hill, S.W.2. [7963]

6 B.S.A. C.B. Combination, 4½ h.p., 3 speeds, kick starter, chain-cum-belt, lamps, generators, horn, screen, with sidecar.—Smith, 1, Charlton Villa, S. Rd., Bedford, Middlesex. [X5481]



## NEW MACHINES ACTUALLY ON SHOW.

<b>MATCHLESS</b> , War Model, 8 h.p. Comb., 3-speed, spare wheel .....	£120 0
<b>ENFIELD</b> , 1917, 2½ h.p., 2-sp., 2-stroke	£44 2
<b>ENFIELD</b> , 1917, 6 h.p., hood, screen ..	£120 0
<b>HARLEY-DAVIDSON</b> , 1917, magneto model, with "C" H.-D. Sidecar ..	£130 0
<b>ROVER</b> , 1917, 3½ h.p., 3-speed countershaft Combination, with Sidecar ..	£99 4/6
<b>ARIEL</b> , 1917, 3½ h.p., 3-sp. Combination	£93 10
<b>LEVIS</b> , 1917, 2½ h.p., 2-speed, Model E ..	£47 10
<b>LEVIS</b> , Popular model .....	£32 0
<b>CALTHORPE-J.A.P.</b> , 1917, 2½ h.p., 2-sp., Enfield gear .....	£39 16
<b>ALLDAYS ALLON</b> .....	£37 10
<b>ROYAL RUBY</b> , all models from .....	£32 10

## SECOND-HANDS.

<b>ENFIELD</b> , 1916, 6 h.p. Combination, lamps, hood, speedometer, screen ..	£84 0
<b>ENFIELD</b> , 1914, 6 h.p. Combination, 3 lamps, horn, engine just been overhauled .....	£68 10
<b>ENFIELD</b> , 1916, 6 h.p. Combination, Lucas dynamo set, condition first-rate .....	—
<b>ENFIELD</b> , 1916, 6 h.p. Combination, with Enfield 2-seater Sidecar, heap accessories, At order .....	£20 0
<b>O.K. JUNIOR</b> , 1914, 2-stroke	£20 0
<b>TRIUMPH</b> , 1913, 3½ h.p., 3-speed, semi-T.T. bars, a nice little solo mount	£32 10
<b>TRIUMPH</b> , 1914, 4 h.p., 3-sp., Sturmeys Archer gear, Milliford Sidecar, speedometer, lamps .....	£48 10
<b>DOUGLAS</b> , 1914, 2-speed, touring model, with access., ridden approx. 500 miles, unscratched .....	£45 0
<b>HARLEY-DAVIDSON</b> , 1915, magneto model Combination .....	£75 0
<b>HARLEY-DAVIDSON</b> , 1915, magneto model and Phoenix Sidecar .....	£72 10
<b>SINGER</b> , 1913, 4½ h.p., 2-speed, countershaft, and splendid cane Sidecar, speedometer, lamps, and horn ..	£35 0
<b>ARIEL</b> , 1915-16, 3½ h.p., countershaft Combination, kick-starter, decompressor, speedometer, lamps, horn, original tyres still on .....	£72 10
<b>A.J.S.</b> , 1914, 6 h.p. Combination, 5 gn. speedometer, 3 lamps, horn, wind-screen, hood .....	£77 10
<b>CALTHORPE-J.A.P.</b> , 1915, 2-sp., lamps, horn, original tyres still on, unused last 15 months, like new .....	£28 10
<b>LEVIS</b> (Baby), 2½ h.p., fine condition	£23 10
<b>WATSONIAN</b> , 2 model "G" lightweight Sidecars, new .....	£10/18/6
<b>HAZLEWOOD-J.A.P.</b> , twin 5 h.p., 3-sp., and coach Sidecar, all accessories, hood, and screen .....	£53 10
<b>NEW HUDSON</b> Combination, 3½ h.p., 3-speed .....	£35 0
<b>B.S.A. Auto-Wheel</b> .....	£7 10
<b>B.S.A. Auto-Wheel</b> , splendid condition	£10 10
<b>PHENIX Sidecar</b> .....	£7 10
<b>P. &amp; M.</b> , 1913, 3½ h.p., 2-speed, kick-starter, decompressor, T.T. bars, lamp, horn, spare chains .....	£31 10
<b>FORD</b> , 1916, touring 5-seater, ridden 869 miles only, 5 detachable wheels, all access., originally sold new by us less than 12 months ago .....	—
<b>B.S.A.</b> , 1916, Model H. and G.K. Sidecar, ridden only 900 miles, speedometer, lamps, and horn .....	£68 10
<b>B.S.A.</b> , 1913, 3½ h.p. Swan Combination, speedometer, lamps, horn, and luggage grid .....	—
<b>ROVER</b> , 1917, 3½ h.p., solo, ridden 50 miles .....	—

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# MOTOR CYCLES FOR SALE.

## B.S.A.

B.S.A., late 1916, 3-speed, chain drive, Watsonian sidecar, splendid condition, new extra heavy Dunlops, P. and H. lamps, mechanical horn; £58.—Gooder, Gisborne Rd., Wellingborough. [X5452]

B.S.A., 1914, 2-speed, 3½ h.p., in fine running order, £33/5; 4½ h.p., 1916, £52/10; 4½ h.p., 1916, with C.B. sidecar, £65; exchange or extended payments.—Service Co., 292, High Holborn, London. [X5500]

1916 B.S.A. Coachbuilt Combination, 4½ h.p., chain-cum-belt, 3 speeds, clutch, kick start, fully equipped, and like new throughout; 60 gns.—Green, 3, The Mews, Victoria Rd., North Side, Clapham Common, S.W. [8057]

1915 B.S.A. and wicker sidecar, 4½ h.p., 3-speed countershaft, belt and both tyres of machine absolutely new, lighting set, horn, tools; £46; cash transaction only.—George Rogers, Feathers Hotel, Warrington. [7953]

B.S.A., 3½ h.p., 2-speed, clutch, kick start, new tyres, Watford speedometer, horn, mirror, lamps, tools, spares, with Supreme sidecar, hood, screen, apron, petrol grid, in perfect condition; £45/10.—40, Summerfield Crescent, Edgbaston. [X5443]

B.S.A., 1916, Model H, and sidecar and accessories, £68/10; also 1915, Model K, sidecar and accessories, £63; also 1913 model, 3-speed hub gear, and Swan sidecar, actually in stock.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8202]

## Calcott.

CALCOTT, 1914, 2½ h.p., 3-speed; 19 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead (D) [7441]

## Calthorpe.

COLMOKE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [80799]

CALTHORPE, 2-stroke, 1915, speedometer, lamp; £28, or offers.—Drake, Davington House, Faversham. [X5375]

CALTHORPE-J.A.P. 1916 4-5h.p. Combination, fully equipped, speedometer, excellent condition; 60 gns.—3, Lower Richmond Rd., Putney. [8083]

CALTHORPE, 1917 J.A.P., latest model, brand new, Enfield 2-speed, in stock; 39 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7519]

CALTHORPE, 1917, 2-stroke, Enfield 2-speed, latest model; 34 gns.; brand new, in stock.—Wilkins Simpson, and Co., 11, Hammersmith Rd., London. [7520]

CALTHORPE 2-stroke, Enfield 2-speed, new, but slightly shop-soiled; special bargain, 30 gns.—Wilkins, Simpson, and Co., 11 Hammersmith Rd., London. [7521]

1917 4-5h.p. Calthorpe-Jap, twin, 2-speed Enfield gear, chain drive, £63, cash; easy payments arranged.—Jones' Garage, Broadway, Muswell Hill, N.10 [8065]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Latest type 1917 Calthorpe-Jap, 2½ h.p., Enfield gears, sloping tank, as new; 33 gns. (D) [8237]

CALTHORPE-J.A.P.'s, 1917 models, fitted with 2-speed Enfield gear; £39/18; 2½ only charged for the convenience of easy terms.—Wauchope's, 9, Shoe Lane, London. [8200]

CALTHORPE.—1917 models in stock at P. J. Evans, John Bright St., Birmingham, the Birmingham and Midland agent. Two-strokes, four-strokes, and 4-5h.p. twin J.A.P. combinations, also ladies' models. [8212]

## Camplon.

CAMPION, 1917, 8h.p. J.A.P. engine, 4-speed Jardine gear box, coachbuilt sidecar, speedometer, indistinguishable from new; £85.—Percy and Co., 337, Euston Rd., London. [7573]

CAMPION-J.A.P. 1916 6h.p. Combination, khaki shade, Jardine 4 speeds, luggage grid, lamps, horn, etc., not done 1,500 miles, as new, a beautiful outfit; £90.—11, Lime Grove, Newark. [8125]

## Chater-Lea.

1916 7-9h.p. Chater-Lea Combination, complete with all accessories, guaranteed in perfect order; best offer over £65.—Missin, Cottesingham, Hull. [X5471]

CHATER-LEA, 8h.p., 1915, Bosch mag., chain drive, 3 speeds, clutch, kick start, Chater sidecar, complete; £55, or near offer; no dealers.—Padmore, Rensforth St., Rotherhithe, London. [7988]

## Chater-Lea-Jap.

1914 Chater-Lea-Jap 4h.p. Twin Combination, 3-speed S.A. gear, clutch, fully equipped; £33/10.—Wellby Motor Garage, Woodford Rd., Forest Gate. [8143]

## Clyno.

CLYNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham, and Manchester; inclusive price with spare wheel, 100 gns [8084]

1915 Clyno Combination, 3-speed countershaft, detachable wheels, lamps, and accessories, in perfect running order; £52/10; owner serving.—Sims, Preston, Hitchin, Herts. [X5542]

CLYNO, 1914, 6h.p., very good condition, coachbuilt sidecar, hood, wind screen, 3-speed, clutch, kick starter, spare wheel, small car tyres, lamps, speedometer.—Drabbell, 13, Listeria Park, Manor Rd., Stamford Hill, N.16. [8095]



## MOTOR CYCLES FOR SALE.

## Clyno.

CLYNO 8 h.p. Combination, coachbuilt family sidecar, built to take a passenger and 2 children, detachable wheels, nice, smart condition; £72; guaranteed.—Wanchope's, 9, Shoe Lane, London. [8193]

CLYNO, 1913-14, 5-6 h.p., 3-speed, and sidecar, P. and H. lamp set, Cowey and horn, sidecar complete with spare wheel, £62; 1914-15, 3-speed, 5-6 h.p. and sidecar, £69; exchange or extended payments.—Service Co., 292, High Holborn, London. [X5501]

CLYNO Genuine 1916 Coachbuilt Combination, 5-6 h.p. twin, mag., 3 speeds, kick, 4 detachable wheels, hood, large head lamp, speedometer, watch, mirror, great bargain, 75 gas.; exchange; easy terms arranged.—Wandsworth Motor Exchange, Elmer St., Wandsworth (Town Station). [8087]

## Connaught.

CONNAUGHT, 2½ h.p., 1915, 2-stroke, T.T. handlebar, variable ignition, all accessories; £20.—Engles and Co., High St., Acton, W.3. [X5461]

CONNAUGHT Miniature, single speed, new, £33/17/6; ditto, 2-speed, £41/6/6; standard 2-speed, £44/9; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5503]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new; 42 gas.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5502]

## Douglas.

DOUGLAS Motor Cycles, brand new, delivery from stock against priority permits.

DOUGLAS, 1916, 4 h.p., 3 speeds, combination, as new; £75.

DOUGLAS, 1915, 4 h.p., 3 speeds, combination; £70.

DOUGLAS, 1915, 2½ h.p., 2 speeds, in good condition; £42.

DOUGLAS, 1914, 2½ h.p., 2 speeds, in good condition; £38.

DOUGLAS, 1913, 2½ h.p., 2 speeds, in good condition; £31.

DOUGLAS, 1911, in real good order; £17; exchange and deferred payments.—Percy and Co., 337, Euston Rd., London. [7573]

DOUGLAS, 1911, Bosch, Amac, good condition.—57, Trinity Rd., Wood Green, N. [8117]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, 2 speeds, lamps, etc., new tyres; £32.—61, Marlethorpe Rd., Thornton Heath. [8184]

2½ h.p. 1914 Douglas, good order; owner going Overseas; £35.—King Smith, Grove House, Beaconsfield. [X5364]

DISMANTLING a 1913 2½ h.p. Douglas, all parts for sale.—Wright, R. Shiers, Cotswold, Groby Rd., Altrincham. [X5485]

2½ h.p. T.T. Douglas, 1914 model, 2-speed, also condition; £35; guaranteed.—Wanchope's, 9, Shoe Lane, London. [8194]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Infant, Yeovil. Tel. 50. [5855]

DOUGLAS, 1914, T.T., 2½ h.p., 2-speed, perfect; £45.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8103]

DOUGLAS, 2½ h.p., 1911 twin, just been thoroughly overhauled; £16, or near offer.—Warren, Boreham, Thelmsford, Essex. [X5384]

DOUGLAS, 2½ h.p., 1914-15, T.T., 2 speeds, footboards, faultless; owner in France; £37.—Richmond House, E.13. [7985]

COLMORE Depots, Birmingham, Manchester, and Liverpool, and Leicester, for earliest delivery of Douglas motor cycles. [0800]

DOUGLAS, 1913, 2½ h.p., 2 speeds, T.T. handlebars, £31/10; 1912 2½ h.p., 19 gas.—Motor Exchange, Horton St., Halifax. [8051]

DOUGLAS, 2½ h.p., 2-speed, condition perfect, every accessory; bargain, £40; after 7 p.m.—Sennitt, 33, Nicoll Rd., Willesden, N.W. [7953]

DOUGLAS, 1914, T.T., 2-speed, fully equipped, excellent order; petrol free; £32/10.—A. Dore, 107, Finchley Rd., Swiss Cottage, N.W. [7961]

1912 Douglas, 2½ h.p., single speed, lamps, horn, speedometer; £18. Elco and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [0491]

DOUGLAS, 1913, in excellent condition, speedometer, tools, good tyres, lamps; a real bargain; £30.—Relford Garage, 47, Streatham Hill, S.W.2. [7964]

DOUGLAS, 4 h.p., 2-speed, clutch, kick start, coachbuilt sidecar practically unmarked; £75.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7624]

DOUGLAS, 1914, 2½ h.p., 2-speed, T.T., perfect condition, fully equipped, electric light, and few spares; 35 gas., or near offer.—Treccan, 2, Thames St., Staines. [8178]

2½ h.p. Douglas, absolutely new; immediate delivery of model T. V. W. clutch, kick start, gear, and priority permits, for doctors, farmers, war and munition workers. How and where to apply.—For full particulars, write to the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [8020]

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## Douglas.

1916 4 h.p. Douglas Combination, 3 speeds, condition as new, fast and reliable outfit, fully equipped.—Wellby Motor Garage, Woodford Rd., W.6 Gt. [8]

DOUGLAS, 1913, 2-speed, Bosch mag., £35/10; 15 clutch and kick starter, £45; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5501]

1915 2½ h.p. Douglas, 2 speeds, fitted with electric lighting, mechanical horn, first-class machine.—Wellby Motor Garage, Woodford Rd., W.6 Gt. [8]

DOUGLAS, 2½ h.p., 1914, 2-speed, T.T. bars, 8 tyres, head lamp, generator, very nice condition throughout; £35.—Advertiser, 156, Gt. Portland W.1. [8]

DOUGLAS, 4 h.p., 1915, 2-speed, clutch, kick start, speedometer, lamps, etc., machine like new; 14 no offers.—King, Chemist, Sutton, Surrey. [Pha Sutton 646. [8]

DOUGLAS, 1914, 2½ h.p., T.T. plated exhaust, 1 equipped, 33 gas.; also Alldays 2-stroke, T. £23.—Soul, 29, Ropemakers Fields, Limehouse, E. By appointment. [8]

4 h.p. Douglas Combination, 1915, 3 speeds, clutch, kick starter, Binks, Cowey, Lucas lighting, Lucas horn, spare tyre belt, chain, valves; £70.—Farnshaw St., Hertford. [8]

DOUGLAS, 2½ h.p., booter, lamps, running on half paraffin, half petrol, when warm all paraffin second tank for paraffin, perfect tyres; £13.—B. Wakefield, Stony Stratford. [8]

1914 (November) Douglas, 2½ h.p., 2-speed, L lamp set and horn, brand new condition, scratched, guaranteed faultless; £34.—Rose, 14, Gt. St., Globe Rd., Old Ford Rd., N.E. [8]

1916 Douglas Combination, 4 h.p., 3 speeds, lamp horn, generator, and tools, lovely condition sacrifice; £22.—owner with horses; seen by appointment.—27, Cranmer Rd., Forest Gate, E. [8]

DOUGLAS, 2½ h.p., 1915 T.T. model V, not rid more than 6 journeys, condition better than 1 2-speed gear, dropped bars, high compression, fast; 1 guaranteed.—Wanchope's, 9, Shoe Lane, London. [8]

SPORTING Model Douglas, 2½ h.p., late 1914, speed T.T., disc wheels, long exhaust, 1 equipped; £44, or exchange good lightweight (high) or combination.—Albert, 1, Church St., Kingston, S. [8]

RIDER TROWARD and Co., 31 and 78, High Hampstead.—1915 4 h.p. Douglas coachbuilt combination, 3-speed, 59 gas.; 1915 Douglas, 2½ h.p., speed, 39 gas.; 1914 Douglas, 2-speed, T.T., 34 gas. [7]

## Edmund.

EDMUNDS (new), 2½ h.p. J.A.P., Royal Enfield speed, spring frame, double tank, strongly built machine; £54/12/6; extended payments arrange Harrods Motor Showrooms, 118, Brompton [8]

## Enfield.

ENFIELD 6 h.p. Combination, 1916; £85.—272, Gt. St., Forest Gate. [79]

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below. [8]

ENFIELD 3 h.p. Twin; £57/10; and 2½ h.p. 2-speed; £45; delivery from stock.—Exeter Motor Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Devon. [8]

COLMORE Depot, 31, Colmore Row, Birmingham for immediate delivery of Enfields. [10]

ENFIELD, 3 h.p., 2-speed, excellent condition, lamp horn; £40.—41, Elm Rd., New Malden. [8]

ENFIELD Motor Cycles.—Prompt delivery all models.—P. J. Evans, John Bright St., Birmingham. [8]

ROYAL Enfield 1916 3 h.p. Twin, splendid condition, does 600 miles; £46.—Dr. Ogilvy, Birstall, L. Leeds. [X5]

ENFIELD 1917 6 h.p. Dynamic Lighting Combination, little used; 98 gas.—Box L4,500, c/o Motor Cycle. [47]

ENFIELD 1914 Combination, fine condition, coachbuilt sidecar, 3 lamps, very little used; £65.—High Rd., Wood Green. [8]

LATE 1916 3 h.p. Enfield Combination, Concoet car, mileage under 2,000; £58.—Miss H. Hall, 7, Herbert Rd., Brighton. [8]

3 h.p. Twin Enfield, 2-speed, kick start, horn, lamp, tools, spares, perfect, about 1,000 miles; £414, Chippy St., New Cross, S.E.14. [8]

1915 Enfield, 3 h.p., lamps, horn, speedometer, beautiful condition; £38.—Elco and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [10]

ENFIELD Combination, 6 h.p., 1914, Lucas, Stewart speedometer, wind screen, etc., small age.—Collings, 14, East Hill, Dartford. [X5]

ENFIELD Combination, 6 h.p., late 1916, fine condition throughout, speedometer, lamps, and £85.—Taylor, 149, Balby Rd., Doncaster. [X5]

ENFIELD 6 h.p. Combination, late 1916, only 1 week-ends, condition perfect; 78 gas., with 1 given in free.—Harrington, Chemist, 137, Wood Rd., Ilford, London. [17]



# MOTOR CYCLES FOR SALE.

**Enfield.**  
5 Enfield 6h.p. Combination, good condition, all spares, lamps, etc.; trial if needed; price £65.—the, 43, Edwards Terrace, Abertridwr. [X5374]  
NEW Combination, Easter, 1917, 1,000 miles, new condition, electric lamps, new oversize rear. £90.—Write, 31, Norman Av., St. Margaret's. [8011]  
FIELD, 5h.p., late 1915, completely equipped with speedometer, horn, tools, lamps, etc., condition to new; £40.—Longman Bros., King St., Acton. [8225]  
FIELD, 6h.p., late 1914, 2-speed, handle starter, good tyres, coachbuilt sidecar, head lamp, generator lamp, fully equipped, and perfect throughout; a, 265. Below. [8225]  
FIELD, 2½h.p., 1914, 2-speed, kick starter, all hata drive, Enfield grey, good tyres, head lamp, for rear lamp, been thoroughly overhauled, per-roughout; bargain, £34.—Mabes and Mabes, 156, Portland St., W.1. [7261]  
FIELD Combination, late 1914, run 9,000 miles, mps, horn, speedometer, etc., good condition; r offer; seen any evening or week-end.—17, Limes Hill Hill, N.W.7. [8077]  
FIELD, 2½h.p., new 1917 2-stroke lightweights, speed gear and free engine; £44/2; extended pay-arranged, 2% only charged for the convenience. chope's, 9, Shoe Lane, London. [8199]  
FIELD 1916 Combination, 6h.p., mileage 3,800, almer cords, wind screen, speedometer, hood, 3 spare chain, valves, etc., Tansad seat, perfect on; £86.—Adams, 13, Hamilton Rd., Reading. [8187]  
5 6h.p. Enfield Combination, hot air intake, spare tyre, tube, 3 lamps, light car type Low generator, spare plugs, tools, etc., splendid condition; seen agent; £70.—Schofield, 89, Albert Rd., W.12. [X5427]  
FIELD 6h.p., 1916 Combination, Palmer cord light r tyres all round, large head lamp, generator, mp, luggage carrier to sidecar, very nice condi-roughout, and fully equipped; £90.—Advertiser, r Portland St., W.1. [7904]  
5 6h.p. Enfield Combination, Lucas dynamo light-ing, only done 3,600 miles, in splendid condi-tion with pillion seat, dress guard, and luggage a lovely outfit; £95.—Wellby Motor Garage, rd Rd., Forest Gate. [8146]  
FIELD 1915 Combination, 6h.p., 2-speed, clutch, Thompson-Bennett mag., Amec carburettor, fitted mps, Stewart speedometer, and horn, £87/10; 2-speed, £20; E.P. or exchange.—Service Co., igh Holborn, London. [X5505]  
1917 Royal Enfield Combination, Colonial Model, ed with hood, all Lucas accessories, sidecar lamp, mp, and tail lamp, not ridden 500 miles, just as ould be sold as such, tools to complete; £110; ted.—Wauchope's, 9, Shoe Lane, Fleet St., Lon-Phone: Holborn 5777. [8195]  
FIELD 1916 Combination, perfect condition, as ew, Orto wind screen, Lucas lamps, horn, and Pillion seat with back-rest, watch, Stewart horn, grid with petrol carrier, 2 tyres, chain and other £25, lowest, complete; £76 without extras.—ton, Picture Framer, 24, Battersea Rise, Olap-monon, London. [7993]  
FIELD 1917 6h.p. Combination, hood, screen, mps, speedometer, ridden 200-300 miles only; 6h.p. combination, 2-seater sidecar, heap acces-beautifully kept; also 1916 6h.p. dynamo light-ft, ridden 200 miles; also 1914 6h.p. combina-ike new, £68/10; all actually in stock; also tion of two or three more good lots; prices rticulars on application.—Lamb's, 151, High St., mstow, and 50, High Rd., Wood Green, N. [8201]  
**Excelsior.**  
ER TROWARD and Co., 31 and 78, High St., Hampstead.—British Excelsior, 1914, 5-6h.p., 2-ountershaft, 20 gn. coach sidecar; 49 gns. (D). [7918]  
ELSIORS.—All models in stock; magneto model 75, electric lighting model £85; got a big X be satisfied.—Colmore Depot, Birmingham, Man-ber, Liverpool, and Leicester. [X1462]  
**F.N.**  
(date), 2½h.p., mag., 2 speeds, shaft; £15/10.—Ebner St., Wandswoth. [8088]  
2½h.p., 2-speed, and clutch, 1914, as new; £28.—272, Green St., Forest Gate. [7957]  
**Garage.**  
AGE, 2½h.p., 1914, 3-speed, perfect condition, 120 to gallon; £17/10.—Fairview, Brooke Av., Harrow. [X5089]  
**Harley-Davidson.**  
3 Harley-Davidson Combination, new condition; £80.—Ross, 86, High Rd., Lee. [8012]  
LEY 1915 Combination, fitted complete, little sed; £70.—51, Maplethorpe Rd., Thornton Heath. [8185]  
LEY-DAVIDSON Combination, 1915, new 1916, ynamo lighting, in splendid condition; £70.—32, ere Rd., Wigan. [X5490]  
LEY-DAVIDSON Combination, 1916, electric ighting, speedometer, perfect condition; £86.—Hob-lyver St., Salisbury. [X5378]

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**Harley-Davidson.**  
HARLEY Combination, 1916 (Sep.), electric model, as new, all accessories; £90; exchanges considered.—Box L4,536, c/o The Motor Cycle. [8221]  
COLMORE Depot, Birmingham, Manchester, Liver-  
pool, Leicester, for immediate delivery of all models  
of Harley-Davidsons, and spare parts. [8082]  
HARLEY-DAVIDSON, 7-9h.p., 3 speeds, combination,  
electric equipment, in nice condition throughout;  
£70.—Percy and Co., 337, Euston Rd., London. [7576]  
HARLEY-DAVIDSON, 1915 electric model, Phoenix  
sidecar, splendid condition; Reading district; 70  
gns.; late Morgan wanted.—Box L4,526, c/o The Motor  
Cycle. [8061]  
HARLEY-DAVIDSON, 1915 magneto model, new  
Phoenix tandem sidecar, Lucas head lamp, splen-  
did family outfit; £75.—Langan, 292, Kingsland Rd.,  
London, E.8. [X5418]  
7-9h.p. 1916 Harley-Davidson Combination, powerful  
machine and fast, includes coachbuilt sidecar and  
all accessories; £75; guaranteed.—Wauchope's, 9, Shoe  
Lane, London. [8157]  
HARLEY-DAVIDSON, late 1915, Bosch mag., Gloria  
sidecar, hood, screen, and Coverall, Lucas lamp,  
tip-top combination; £75.—Davies, Zoar St., Lower  
Gornal, Staffs. [X5464]  
1915 7-9h.p. Harley Combination, 3-speed, fully  
equipped, 1917 condition throughout, like light-  
ning, tyres unscratched, perfect in every way; £80.—  
Webb, Belmont, Surrey. [8010]  
HARLEY-DAVIDSON Combination, late 1916, con-  
dition unapproachable, complete with electric  
lights, an outfit really worth the money; £85.—Long-  
man Bros., King St., Acton. 'Phone: 1578 Chiswick.  
8226  
HARLEY-DAVIDSON 11J, purchased new April,  
1916, run 1,800 only, condition as new, fitted last  
week with brand new latest Harley-Davidson £24/10  
sidecar; £86, no offers.—Law, 59, Revelstoke Rd.,  
Wimbledon Park, S.W.18. [8151]  
RIDER TROWARD and Co., 31 and 78, High St.,  
Hampstead.—7-9h.p. Harley-Davidson, special  
T.T. model, 3-speed, clutch, kick start, dynamo light-  
ing, disc wheels, olive-green finish, in new condition  
and hardly used; 65 gns. (D) [8233]  
HARLEY-DAVIDSON, 1917, electric model, and  
their best sidecar; also 1917 magneto and their  
best sidecar; also 1917 magneto and their best sidecar;  
also 1916 electric model and their own sidecar, £29/10;  
also two 1915 magneto models with sidecar and acces-  
sories attached, £72/10 and £76 each.—Lamb's, 151,  
High St., Walthamstow, and 50, High Rd., Wood  
Green, N. [8204]  
**Hazlewood.**  
HAZLEWOOD 5-6h.p. Combination, 3-speed counter-  
shaft, 1916, as new; £75.—272, Green St., Forest  
Gate. [7956]  
HAZLEWOOD, 1915, 6h.p. twin combination, 3  
speeds, combined belt and chain, kick starter;  
£62/10.—R. Alexander, Bacon Farm, Hungerford, Berks.  
[X5363]  
1915 Hazlewood Combination, 5-6h.p. 3-speed J.A.P.  
engine, lamps, horn, luggage grid, splendid con-  
dition; £60.—Elce and Co., 15-16, Bishopsgate Av.,  
Camomile St., E.C.3. [0481]  
HAZLEWOOD 1915 Combination, 5-6h.p. J.A.P. en-  
gine, 3-speed clutch, and kick starter, Lucas lamps,  
speedometer, special sidecar; £72/10; extended payments  
or exchange.—Service Co., 292, High Holborn, London.  
[X5506]  
**Henderson.**  
1915 Henderson Combination, very fast, sound con-  
dition; £75.—Ross, 86, High Rd., Lee. [8013]  
**HENDERSON**, 4-cyl., Bosch mag., speedometer,  
lamps, Gondola sidecar, tyres perfect, good order;  
any trial; £55; owner now unable to ride.—Bedford  
Works, Bedford Rd., East Finchley, N.2. [8131]  
**Hobart.**  
RIDER TROWARD and Co., 31 and 78, High St.,  
Hampstead.—1915 Hobart, 2-speed, 2-stroke; 22  
gns. (D) [7919]  
**Humber.**  
HUMBER Flat Twio Motor Cycles immediately from  
Colmore Depot, Birmingham. [0882]  
HUMBER Lightweight, lamps; £14; in perfect order.  
—Overton, 192, Baker St., Enfield. [7987]  
1914 3½h.p. 3-speed Humber, lamp, etc.; £35, cash  
or easy terms.—R. E. Jones (Garages), Ltd., Swan-  
sea. [0863]  
1913 3½h.p. 2-speed Humber and sidecar, spring  
forks, in good condition; £22.—P., 96, Links Rd.,  
Tooting. [X5377]  
HUMBER, 3½h.p., 2-speed, kick start, very nice  
condition; £32.—W. and H. Motor Co., Ltd.,  
287, Deansgate Manchester. [8104]  
HUMBER, 1912, 3½h.p., 2 speeds, spring forks, in  
good condition, £24; 3½h.p., single geared, £14/10.  
—Motor Exchange, Horton St., Halifax. [8032]  
1914-15 Water-cooled Humber, 3½h.p., 3-speed,  
clutch, kick start, in splendid order; £30.—Elce  
and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3.  
[0492]  
3½h.p. Humber, 1912, 2-speed Roco, clutch, F.E., cane  
£2 sidecar, spare tyre and tube, lamp, horn, tools,  
good order; any trial; £22/10.—115, Edenbridge Rd.,  
Bush Hill Park. [X5404]



## MOTOR CYCLES FOR SALE.

## Indian.

1912 4b.p. Blue Indian, 2 speeds, free engine; £22/10. Motor Exchange, Horton St., Halifax. [8033]

INDIAN 1915 Combination, 7-9b.p., 3-speed, electric light, horn.—Young, 6, Monston St., Glasgow, S.S. [X5446]

INDIAN, 1916, 7-9b.p., 3 speeds, spring frame; £57/10; exchange Douglas.—5, Victoria Av., Sutton. [X5530]

INDIAN, 5-6b.p., 3 speeds, 1915 model, practically as new; lowest price £48/10.—Passey and Hall, Ltd., Ross, Herefordshire. [X5532]

1915 Indian, 5-6b.p., with Canoelet sidecar, in splendid condition, perfect order; £55.—Lewis, 61, London Rd., Twickenham. [7968]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 Indian, 2-stroke, 3-speed, clutch, kick-start; 77 gns. (D) [7930]

1915 Indian, 5-6b.p., excellent condition, good running order, 3 speeds, Binks carburetter; £27.—Box L4,535, c/o The Motor Cycle. [8223]

7-9b.p. Indian Combination, 1914, very fast, not done 8,000 miles; any trial; £57/10.—The Purley Motor Garage, Ltd., Purley. Tel.: Purley 103. [7333]

INDIAN, 1913, 7-9b.p., 2-speed, spring frame, good condition; £30, or exchange combination. Stone, 114, Palace Gate Rd., Wood Green, N.22. [X5451]

INDIAN 1915 5-6b.p. Combination, 3 speeds, speedometer, in real nice condition throughout; £60.—Percy and Co., 337, Euston Rd., London. [7575]

INDIAN 1913-1914 Combination, 2 speeds, spring frame, new chains, good tyres, plenty spares, sound condition.—13, Arklow Rd., New Cross, S.E. [8168]

INDIAN, 1914, 2 speeds, kick starter, electric lights, new rear wheel and tyres, spares, runs sweetly; bargain, £48.—Hoggett, 15, Beech Grove Terrace, Leeds. [X5403]

1914 (late) 7-9b.p. Indian, 2-speed, clutch, kick starter, spring frame, £15/15 Millford sidecar; (D); good condition.—Winterbottom, Jeweller, Oldham. [40]

INDIAN, 1914, 2-speed, clutch, 7-9b.p. T.T., very powerful and fast, engine perfect, new tyres, all accessories; £38, or near.—262, Blackhorse Lane, Walthamstow. [7999]

1914 Indian, 7-9b.p., 2-speed, handle starting, spring frame, and Gloria coachbuilt sidecar, in good running order; £32 for quick sale.—Kelvey, 194, Oxford Rd., Manchester. [X5436]

7-9b.p. Indian 1914 Combination, fitted with De Luxe sidecar, 2-speed gear and free engine, and kick start, includes all accessories; £47/10; guaranteed.—Wanchope's, 9, Shoe Lane, London. [8198]

INDIAN, 7-9b.p., 2-speed combination, horn, lamps, sidecar, good running order; owner Overseas; price £45, or close offer.—Calf and Co., Motor Garage, Broadway, Wimbledon, opposite Theatre. [8170]

INDIAN, 1916, 5-6b.p., Montgomery coachbuilt sidecar, 3-speed, etc., very little used, splendid running order, just overhauled, usual accessories; £70.—Frank Irish, 8, Railway St., Chatham. [X5475]

1916 Powerplus Combination, spring frame, lamps, speedometer, in good order; £80, or nearest offer; would exchange Douglas, 3-speeds preferred, and cash.—Bennett, 19, Monument Rd., Wigan. [X5489]

POWERPLUS 1916 7-9b.p. Indian Combination, practically new, condition unscratched; exceptional opportunity to secure the very best; £95, no offers.—Telford Garage, 47, Streatham Hill, S.W.2. [7965]

OCT., 1915.—Indian 5b.p. sporting combination, beautiful condition, unused for 12 months, lamps, mechanical horn, speedometer, mileage 3,500; £52.—Woodman, Blencathra, Maidstone Rd., Chatham. [8112]

1914 7-9b.p. Indian Combination, spring frame, 2-speed, electrically equipped, lamps, speedometer, and horn, already fitted for substitute at owner's will; handsome outfit; £60.—5, The Parade, Belmont, Surrey. [8009]

1915 7-9b.p. Indian Combination, spring frame, 3 speeds, electric lighting and starting, but needs batteries, otherwise excellent condition, mileage just over 1,700; £60.—Robinson, Snaefell, Goddington Rd., Strood, Rochester. [8025]

INDIAN-CENTAUR, 4b.p., fitted for substitutes, red enamelled, all chain drive, special large tank, Bosch, free engine, h.b.c., lamp, horn, pump, toolbag; seen any time; must sell; £17, or close offer.—Ramsey, Drug Stores, Sunbury. [8113]

1916 Indian Powerplus Combination, spring frame, Splendid mag., dynamo, 3-speed, clutch, hand and foot controlled, mileage 2,000, all accessories and spares, 70 m.p.g.; £90; after 8.30 p.m.—86, Tynerton Rd., Taffel Park, N. [8175]

INDIAN Combination, 5b.p., 1915-6, 3-speed, Millford coachbuilt SHR sidecar, complete set Lucas lamps and horn, Corbin-Brown speedometer, dual clutch control, outfit not run 1,500 miles, and is indistinguishable from new; £70.—2nd Lt. Taylor, Southsea Castle, Portsmouth. [8044]

INDIAN 1915 Model, 7-9b.p., spring frame, 2 speeds, Millford coachbuilt sidecar, electric horn and lamps, speedometer, watch, etc., 2 new Kempshalls, cycle running parts and chains recent, excellent runner, takes paraffin without alteration; £59/10, nearest.—Barritt, Northallerton, New Balderton, Newark. [X5372]



## SIDECAR COMBINATIONS.

DOUGLAS, 4 b.p., 1915, 3-speed Combination, 3 lamps, horn, speedometer ..... £66 0

INDIAN, 7-9 b.p., 1915, 3-speed, spring frame, Millford Sidecar to match, all accessories ... £55 0

CLYNO, 6 b.p., 1914, khaki finish, detachable wheels, 3-speed ..... £65 0

EXCELSIOR, 8-10 b.p., 1915, 3-speed, coachbuilt Sidecar, electric lighting ..... £48 0

HUMBER, 8-10 b.p., 3 speed, handle starting, coach-built Sidecar, all accessories ..... —

## SOLO MOTOR CYCLES.

SCOTT, 1914, 4 b.p., 2-speed, and kick-start, just being overhauled ..... —

RUDGE 4 b.p. Multi, tyres like new, pedal-starting NEW IMPERIAL-J.A.P., 1915-16, 2 1/2 b.p., 2-speed, 2 lamps and horn. Had very little use .... £28 0

LUGTON, 1915, 3 1/2 b.p., good tyres, fine solo mount, Cheap ..... £24 0

REX 4 b.p. de Luxe, 2-speed, and handle-start, 2 1/2 b.p. tyres, spring forks ..... £22 0

RUDGE, 1912, 3 1/2 b.p., fixed gear, very fast, ... £21 0

RUDGE 3 1/2 b.p. clutch model, just overhauled, and new tyres fitted ..... £26 0

CALTHORPE, 1915, 2-speed, 2-stroke, adjusted to run on paraffin ..... £22 0

BAT-J.A.P., 5-6 b.p., special T.T. model, round tank. Very fast ..... £20 0

ARIEL, 2 1/2 b.p., 3-speed, lightweight, magneto. Like new ..... £22 0

ALLDAYS MATCHLESS, 2 1/2 b.p., 2-speed, 2-stroke, requires assembling ..... £15 0

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16J, Sidecar comb... (near offer) £90 0

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Millford Empress ..... £16 0

C.B. Sidecar, suit Harley ..... £4 0

Canoelet, requires painting, suit Harley, otherwise sound ..... £5 0

Wanted good Second-hand Machines for cash, or sold on commission.

37, Turnham Green Terrace (near Turnham Green Station), LONDON, W.



## MOTOR CYCLES FOR SALE.

## Indian.

4 b.p. Blue Indian, very fast; bargain, £14.—L4,530, c/o The Motor Cycle. [1]

1915 3 1/2 b.p. Indian, semi T.T., 3-speed, bought 1 original tyre good for 3,000, very fast machine fitted for use of heavy inlets, 55 m.p.h., and 90 m wearing parts throughout equal to new, all new spares; £47, or exchange A.J.S. or Sunbeam light and cash.—Batten, Treliever, Quinton Rd., Coven [X]

## Ivy.

IVY, 2-stroke, 2 1/2 b.p., 1915, good tyres, equipped, as new throughout; £23.—Adams, 156, Gt. Portland St., W.1. [X]

IVY, 2 1/2 b.p., 2-stroke, single speed, excellent action throughout; £25/5; exchange or extended terms.—Service Co., 292, High Holborn, London [X]

## James.

COLMORE Depot, 261, Deansgate, Manchester, in stock complete range of James motor cycles [X]

JAMES, kick start, gate change, 3-speed, twin Drums, eight oil feed; £40.—Platts, 602, K Rd., Fulham. [X]

JAMES 3 1/2 b.p. Twin, solo, 1916, 3-speed combination, T.T. bars, good order and condition; —Ivy Cottage, Chillingham, Kent. [X]

JAMES 4 1/2 b.p. 3-speed Combination, August, 1 only done 800 miles, perfect condition; £1 Wright, Dunolly, Milngavie, Dunbartonshire. [X]

RIDER TROWARD and Co., 31 and 78, High Hampstead.—New James machines in stock immediate delivery. Catalogue free. Also one James de Luxe combination, with Lucas dynamo lighting, 79 gns. (D) [X]

RIDER TROWARD and Co., 31 and 78, High Hampstead.—New 1917 James, 4 1/2 b.p., 34 model, in stock, £69/10; also de Luxe James combination, 1917, with Lucas dynamo lighting, 79 gns. (D) [X]

## J.A.P.

J.A.P., 4b.p., 3 speeds, late 1914 model; 20 gns. 66, Greyhound Lane, S.W.16. [X]

3 1/2 b.p. T.T. J.A.P., very smart and fast, perfect condition; £25; girl's cycle or piano part.—M Pleasant, Rowledge, Farnham, Surrey. [X]

## J.H.

J.H., 2-speed, new; £35/14; extended payment exchanges.—Service Co., 292, High Holborn, London. [X]

J.H., 1917, new, 2 1/2 b.p., 2-speed, 2-stroke; 42 gns. W. and H. Motor Co., Ltd., 287, Deans Manchester. [X]

J.H., 9b.p. M.A.G. engine, 4 speeds, free engine, new coachbuilt Bramble sidecar; £75.—Motor change, Horton St., Halifax. [X]

## Lea-Francis.

LEA-FRANCIS 1915 Coachbuilt Combination, 1 mag., 3 speeds, kick, countershaft, chain; magnificent lot; 65 gns.—Wandsworth Motor Exchange, Elber St., Wandsworth (Town Station). [X]

## Levis.

1916 Levis, equal new, perfect condition; £21.—179, Brixton Rd., S.W.9. [X]

1915 Levis, real good order; £17, or near, for sale.—Thorne, Whitehorse Rd., Thornton H. [X]

COLMORE Depots, Birmingham and Leicester, delivery of all models of Levis motor cycles in stock. [X]

RIDER TROWARD and Co., 31 and 78, High Hampstead.—1916 Levis Popular, new condition 22 gns. (D) [X]

LEVIS, 2 1/2 b.p., 1915, 2-stroke, head lamp, gear rear lamp, good tyres, fully equipped; bargain.—Advertiser, 156, Gt. Portland St., W. [X]

1914 Popular Levis, 2 speeds, very little used, in good condition, speedometer, accessories; £8 A. Hyde-Parker, 54, Talgarth Rd., W. Kensington. [X]

LEVIS, 2 1/2 b.p., 1917, latest model E, Enfield 2 chain drive, brand new, in stock; £47/10—Kins, Simpson, and Co., 11, Hammersmith Rd., London. [X]

LEVIS, 2 1/2 b.p., 1914, 2-stroke, nearly new; had to join up; head lamp, generator, equipped; only £22 for quick sale.—Whiffen and Estate Agents, Shepperton. [X]

LEVIS, 2 1/2 b.p., No. 1 Model, 2-speed, chain-and-drive, rubber studded tyres, brand new, for immediate delivery; reduced price £44.—Mebes, 156, Gt. Portland St., W.1. [X]

## Lincoln-Elk.

LINCOLN-ELK, 2 1/2 b.p., Bosch, good tyres, very condition; £15.—A. Harding, 20, Liverpool St. Albans. [X]

RIDER TROWARD and Co., 31 and 78, High Hampstead.—Lincoln-Elk, 1913, 3 1/2 b.p., very gear, good order; 19 gns. (D) [X]



## MOTOR CYCLES FOR SALE.

### Lloyd.

OS Combination, Peco engine, 2½ h.p., 2-stroke, 6½, done about 1,000, coachbuilt sidecar, olive match, Penetra combined head and tail light—cost £60, complete, sell £40.—Apply, Newell, Chester's Library, Pinner. [17978]

### Matchless.

Matchless Combination, spare wheel; £120.—oss, 86, High Rd., Lee. [8014]

HLESS, 8 h.p. twin J.A.P., overhead, in teal order and condition; £30.

HLESS, 5-6 h.p. twin J.A.P., free engine; £26.eroy and Co., 337, Euston Rd., London. [7577]

HLESS Motor Cycles: no quicker delivery obtainable than from Colmore Depots. [0881]

HLESS, 1914, 6 h.p. J.A.P., single gear, also city of petrol and substitute; £34.—Clark, 90, Ed., Erith, Kent. [7970]

HLESS War Model, 8 h.p. J.A.P., spare wheel; 20.—Lamb's, 151, High St., Walthamstow, and 1 Rd., Wood Green, N. [8205]

Matchless-Jap, 2-speed, coachbuilt sidecar, tyres new, excellent condition, speedometer, etc.; 61, Berestord Rd., Portsmouth. [8097]

HLESS Combination, 8 h.p. J.A.P. engine, ch mag., double belt drive, complete, lamp set, Lambton Rd., Aigburth Rd., Liverpool. [8115]

HLESS, late 1915, 7 h.p. M.A.G., coachbuilt car, just repainted black, and gold line, as per all accessories; £85.—Cass's Motor Mart, 5, St., Euston Rd., W.1. Museum 623. [6821]

HLESS 1917 Combination, 8 h.p., 3-speed, ch, and kick starter, detachable wheels, including wheel, new; £120; extended payments or ex-Service Co., 292, High Holborn, London. [X5509]

HLESS, 1913-1914, 8 h.p., 1915 Millford Emus sidecar, electric lighting cells, Watford speed-semi T.T. bars, mechanical horn, new chains, h spares, splendid condition throughout; £50, Apply, Dea, 26, Sandbourne Rd., Brockley. [8097]

### Minerva.

RVA, 3½ h.p., 2-speed, and sidecar, needs slight sh; £14.—Gardner, 137, Harvist Rd., Kilburn. [8008]

RVA, 3 h.p., mag., spring forks, Grado variable nr, free engine, etc.; 11 gas.—66, Greyhound rethraon. [8172]

### Motosacoche.

MOTOSACOCHE, 6 h.p. M.A.G. twin engine, o.h. valves, just overhauled, and in splendid order; motosacoche, Ltd., Kenmont Works, Willesden, N.W.10. [7983]

MOTOSACOCHE Twin, 3½ h.p. M.A.G. engine, 2-ed, chain drive, good order, Lucas head light, r, and horn, with sidecar and spares; £58.—coche, Ltd., Kenmont Works, Willesden Junction, W.10. [7982]

### New Hudson.

Hudson, 1912, 3½ h.p., 3 speeds, clutch, lately overhauled and plated; £25.—Box 1,248, c/o The Cycle. [X5534]

Hudson 6 h.p. Twin, 1914, 3-speed, coach side; £60.—W. and H. Motor Co., Ltd., 287, te, Manchester. [7627]

2½ h.p. New Hudson, 2-stroke, 2-speed, free engine, fully equipped, guaranteed; £22.—Well-tor Garage, Woodford Rd., Forest Gate. [8147]

Hudson, 1913, 3½ h.p., 3-speed, clutch, in good nning order; £34/15: exchange or extended pay-Service Co., 292, High Holborn, London. [X5510]

Hudson 1917 8 h.p. Twin Combination, chain-m-belt, as new, not used, spares (all new), ay Dunlop, valve complete, valve springs, belt every spare, new Lucas lamps (three), tools; any £110, nearest offer.—Lee, 303, Parliamentary esgow. [X5371]

### New Imperial.

Imperial, 1917, 2½ h.p., 3½ h.p., 6 h.p. models, stack.—Craw Bros., Guildford. [2563]

Imperial-Jap, 2-speed, clutch, kick start, like new; £40.—W. and H. Motor Co., Ltd., 287, te, Manchester. [7622]

Imperial-Jap: immediate delivery all models.—eter Motor Cycle Co., Ltd., Bath Rd., Exeter, vistock Rd., Plymouth. [0839]

Imperial-Jap, 1917, 2½ h.p., done 140 miles, condition as new; cost £45/10, price £40, offer.—Bickers, 1, Bank St., Bradford. [X5536]

Imperial (new), 2½ h.p., 2-speed; £40/19; tually in stock for immediate delivery; ex-payments arranged.—Harrods Motor Show-113, Brompton Rd., London, S.W.1. [8133]

Imperials, 1917 models in stock; 2½ h.p. model, A.P. engine, 2 speeds, 39 gns.; also clutch models ick starters, one shop-soled 2-speed model, 36 J. Evans, John Bright St., Birmingham. [8214]

Imperial 8 h.p. J.A.P. Overseas War Office Com-munations, as described in detail pages 252-3, Sep- use of this paper, exceptional machine in every immediate delivery from stock; £114/9.—Col- depot, Distributors, Densgate, Manchester, and ushaw St., Liverpool. [0886]

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Send your cheque at once for £6 4s., and obtain early delivery.

Martin Mitchell, Ltd., STAFFORD.

## MOTOR CYCLES FOR SALE.

### Norton.

1915 Norton 3½ h.p. 3-speed Combination.—A. Liller, 4, Finney Rd., Nether Green, Sheffield. [X5220]

1916 Norton, 4 h.p., 3-speed, T.T., and sporting side-car; £89, or exchange.—T., 85, Revelstoke Rd, Wimbledon Park, W. [8244]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 T.T. Norton, mileage 1,000, unscratched; 49 gns. (D). [8236]

1916 3½ h.p. T.T. Norton, in splendid condition, lamps, warning signal, speedometer, etc., very fast; £46.—Empson, Stud Farm, Gamlingay, Sandy. [8096]

### N.S.U.

2½ h.p. N.S.U., front and back sprung, Grado gear, 24 speedometer, good tyres, over 80 to gallon; £14.—H. S. Yaker, 7, Elizabeth St., Victoria. [7706]

N.S.U. Twin, 6 h.p., Grado pulley, coachbuilt side-car, new tyres, lamps, runs on paraffin; £24, or exchange for lightweight.—112, Stroud Green Rd., Finsbury Park. [8161]

HAVING Acquired the entire Stock in Trade of the N.S.U. Motor Co., Ltd., we can now supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Eagles and Co., Acton Hill Works, Acton, W.3. [X5458]

### O.K.

O.K. Junior, Mark VI., 42 gns. See my show.—Jennings, Mitchell St., Glasgow. [8056]

O.K. Juniors.—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn. [0910]

O.K. Juniors.—Millards, of Guernsey. Always latest models in stock; sole agent for Channel Isles. [8055]

O.K. Junior.—One Mark VI. for disposal on work of National importance.—Timberlake, The Motor Man, Wigan. [8053]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—O.K. Junior 1915, good order, 16 gns. (D). [7922]

O.K. Junior.—One or two of these lightweighta in stock.—Kiroso, Murray, and Co., Pilgrim St., Newcastle-on-Tyne. [8051]

O.K. Junior, 1914, 2-speed, tyres and belt new, Lucas horn, spare valves, splendid condition; £18, or nearest.—126, Gorton Rd., Reddish, Stockport. [8207]

O.K. Junior, 1916, 2½ h.p., 2-speed, tyres in good condition, whole machine unscratched; £25/10, or near offer.—78, Northumberland Way, Erith, Kent. [7955]

O.K. Junior, Mark IV., standard, new, 38 gns; O.K. Junior, 2-speed, £24; extended payments or exchange.—Service Co., 292, High Holborn, London. [X5511]

O.K. Junior.—Youngs, The Parade, Kilburn, special agents and repair experts. Several of these machines always on hand. Back my judgment and see them as above. [8054]

### Omega.

1915 3 h.p. T.T. Omega, 2-speed, new tyres; £25.—Miller, 49, Sandchiff Rd., Erith, Kent. [8247]

### P. and M.

1915 P. and M., 3½ h.p., 2 speeds, speedometer, excellent condition, original tyres still on; £38/10.—Owaer, 35, Gardner Rd., Guildford, Surrey. [X5467]

### Peco.

1916 2½ h.p. 2-stroke Peco, perfect condition, runs on paraffin; £24.—Reynolds, Budebury Rd., Staines. [8026]

### Precision.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 Precision, 4 h.p., clutch, enclosed Bosch; 17 gns. (D). [7923]

### Premier.

PREMIER, 1913, 3-speed, clutch, kick starter, fine condition; £28/10.—Eagles and Co., High St., Acton, W.3. [X5462]

1913-14 Premier, sidecar, 3-speed, enamel perfect; £30, offer; exchange; petrol, paraffin.—18, Goulett Rd., Peckham. [8122]

PREMIER, 1915, 3½-4 h.p., mag., 3 speeds, beauty; 35 gns.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Towro Station). [8091]

PREMIER, 2-speed countershaft, handle start, perfect order; also J.A.P. bike, cheap.—Allen, Chippingham House, 616, Attercliffe Rd., Sheffield. [8107]

PREMIER, 2½ h.p., single speed, lamps, and all accessories, just been overhauled, perfect condition; sacrifice £18/18.—Isaac Richards, Rhosymedra, Ruabon. [X5428]

1915 3½ h.p. Premier, 3-speed, and clutch, in good condition; must sell; offers, or would exchange for Douglas.—Handley, Clothier, Netherfield, Notts. [X5417]

1915 3½ h.p. Premier and Sidecar, countershaft gear, a real good machine; £40.—Jones' Garage, Broadway, Muswell Hill, N.10. Deferred payments arranged. [8066]

PREMIER Combination, 1915, 4 h.p., 3-speed countershaft, Canoelet coachbuilt, hood and screen, all good accessories, new tyres and belt, in almost new condition, and only waste seeing; £46; call evenings after 8 o'clock.—Butterworth's Garage, 64, Mill Lane, Brixton Hill. [X5419]



## MOTOR CYCLES FOR SALE.

## Premier.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 Premier, 3½ h.p., 3-speed, countershaft, with underslung coach sidecar; 49 gns. (D) [8231]

PREMIER, 1914, 3½ h.p., 3-speed, Bosch, B. and B., P. and H., Jones, 1917 Phoenix Bullet sidecar, excellent condition: £40.—C. Thorogood, 305, Brockley Rd., Brockley, S.E. [8179]

PREMIER, 1914, 3½ h.p., Armstrong 3-speed, clutch, pedal starter, roomy coachbuilt sidecar, splendid condition: £40; exchange higher power combination and cash.—99, Kedleston Rd., Derby. [X5527]

PREMIER, 1913, 3½ h.p., 2-speed, clutch, sporting cane sidecar, lamps, speedometer, tyres excellent, disc wheels, in good condition and running order: £36.—Mackenzie, Martin's End, Gt. Missenden. [8242]

PREMIER, 3½ h.p., 1913, 3-speed, pedal starter, side entrance wicker sidecar, Dunlop and Rom tyres as new, electric light, speedometer, Bosch, tools, all spares, suit overalls, all in first-class condition: £35/10; would ride 10 miles; after 6 o'clock.—31, Avondale Rd., Palmers Green, N. [X5541]

PREMIER, 1913, 3½ h.p., semi T.T., Bosch waterproof, new B. and B. overhauled and re-enamelled this year, very good condition and appearance: £20, lowest; would exchange with cash for new, or nearly new, Alldays Allan, 2-speed, clutch model.—Full particulars from W. Rycroft, 8, Gordon Rd., Belvedere, Kent. [X5480]

## Quadrant.

QUADRANT, 4½ h.p., 1916, 3-speed countershaft, all chain, kick start, coach sidecar: £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7626]

## Radco.

1916 Radco 2-stroke, in new condition, just been overhauled, fully equipped: £22.—Wellboy Motor Garage, Woodford Rd., Forest Gate. [8148]

## Regal.

4½ h.p. Regal-Precision Combination, 2-speed gear box, 44 clutch, chain drive, hood, screen, luggage carrier, Lucas lamps, horn: £37/10.—Morris, Ernest St., Birmingham. [X5453]

## Rex.

6 h.p. Rex and family sidecar, handle start, free engine, Philipson pulley, 2 new tyres, lamps, overalls; trial: £27.—18, Gransmoor Rd., Higher Openshaw, Manchester. [X5474]

REX 1914 T.T. 6 h.p., just newly done up and overhauled, tyres, appearance, and condition as new; any trial; exchanges: £30, or near offer.—22, Blythwood Rd., N.4. [8220]

2½ h.p. Rex, 3 speeds and free engine, Bosch mag., 24 224/10; 3½ h.p. mag. Rex, 210/15; 6 h.p. twin Rex and coach sidecar, £23/10.—Motor Exchange, Horton St., Halifax. [8036]

REX 1915 6 h.p. Combination, 2-speed, handle start, Lucas lamps and mechanical horn; any trial; very powerful: £48, or nearest.—966, Alum Rock Rd., Washwood Heath, Birmingham. [X5538]

## Roach.

1912 3½ h.p. Silent Roach, Abingdon 2-speed gear, h.b.c. clutch, belt and chain: £24/10.—Motor Exchange, Horton St., Halifax. [8035]

## Rover.

ROVER, 3½ h.p., 3-speed, speedometer, etc.: £30.—A.J., 11, Cassilda St., Plumstead. [7952]

COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [0883]

ROVER, 1915, T.T., engine overhauled, good condition, Philipson pulley: £34.—P. Collyer, Peppering, Arundel. [X5405]

ROVER Motor Cycles; immediate delivery latest 3½ h.p. variable gear and T.T. models.—P. J. Evans, John Bright St., Birmingham. [8215]

ROVER Motor Cycles, 1917 models from stock: £74/10; two only; first cheque secures.—Colmore Depot, 211, Deansgate, Manchester. [0887]

3½ h.p. Rover, 1917, 3-speed countershaft gear, semi 32 T.T. bars, Lucas lamps, horn, etc., perfect condition: £65 cash.—Nott-Bower, R.M.A., Woolwich. [7994]

ROVER, 1915-16, countershaft 3-speed, kick start, 1917 Millford sidecar, Lucas accessories, petrol, spares, absolutely new condition: £62.—Chinery, 32, St. Peter's Sq., Hammersmith. [8121]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—New 1917 Rovers in stock for immediate delivery. Catalogues free. Also one 1917 combination, as new, 79 gns. (D) [8230]

ROVER 1917 3½ h.p. Combination actually here, £299/4/6; also 1917 solo model, ridden 50 miles only, price on application.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8203]

ROVER, 3½ h.p., late 1916, 3-speed countershaft, kick starter, head lamp, generator, rear lamp, very nice mount, perfect throughout: £60.—Mehes, and Mehes, Original Light Car Specialists, 154-6, Gt. Portland St., W.1. [7563]

1914 Rover, with Rover sidecar, 3-speed, new lamp set, all tyres new, horn, 2 belts, one new, the whole turned in first-class condition, full kit of tools, new B. and B. with Pilot jet: £33.—Write, Box 1427, The Motor Cycle. [8062]

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ENFIELD, 1916, 6 h.p. Combination, perfect	82 gns.
HARLEY-DAVIDSON, khaki model, 7-9 h.p., 3-speed, disc wheels	65 gns.
INDIAN, 1916, 2-stroke, 3-speed, clutch	37 gns.
INDIAN, 1915, T.T., 7-9 h.p., clutch model	39 gns.
JAMES, 1917, de Luxe Combination, Lucas dynamo lighting	79 gns.
LEVIS, 1916, Popular, in new condition	22 gns.
LEVIS, 1915, 2½ h.p., 2-speed	26 gns.
NORTON, 1916, T.T., as new throughout	49 gns.
O.K.-JUNIOR, 1915, 2-speed	16 gns.
PREMIER, 1915, 3½ h.p., 3-speed, countershaft, coach Sidecar	47 gns.
RUDGE-MULTI, 1917, olive green tank, as new	47 gns.
ROVER, 1917, de Luxe Combination, mileage 200	82 gns.
SCOTT 1915 coach Combination, as new	55 gns.
TRIUMPH, 1917, countershaft model	76 gns.
TRIUMPH, 1914, 4 h.p., 3-speed, solo	38 gns.
ZENITH, 1915, 8 h.p., T.T., very fast	46 gns.

## LIGHT CARS.

CARDEN de Luxe, 1916, 2-speed, 6 h.p. J.A.P. dicky	55 gns.
CARDEN de Luxe, 1915, 2-sp., 6 h.p. J.A.P.	47 gns.
G.N., 1914, 8-10 h.p., 2-seater, fac order	69 gns.
G.W.K., 1914, standard model, overhauled, fully equipped	129 gns.

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## MOTOR CYCLES FOR SALE.

## Royal Ruby.

1916 Royal Ruby 2-stroke, excellent condition, must sell: £20, or nearest.—436, White Rd., Thornton Heath. [8148]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—New 1917 Royal Ruby 3½ h.p. J.A.P., Starmey countershaft gears, 69 gns. (D) [8231]

## Rudge.

RUDGE, I.O.M. special, fast machine, almost £50. [8230]

RUDGE, N.S.U. 2 speeds, in nice condition: £20.—Percy and Co., 337, Easton Rd., London. [8230]

5-h.p. Rudge Multi, very powerful, fine coach cor: £45.—Motor Exchange, Horton St., Halifax. [8036]

RUDGE, 1914 T.T., very fast, condition as great bargain, £30.—Sergeant-Major Swan, 30, El Rd., Lee, S.E. [8230]

RUDGE Multi Combination, 1914, 5-h.p., new T.T. belt, speedometer, splendid condition: £50.—Wantage Rd., Reading. [8230]

RUDGE Grado, 3½ h.p., fully equipped: a cheap reliable machine: £20.—Wellboy Motor Co., Woodford Rd., Forest Gate. [8148]

1913 Rudge Multi T.T., new tyres, lamps, horn: a very bargain, £32.—W. Watson, View, Ackworth, Pontefract. [8230]

1913 Rudge Multi, in splendid order, £31; with 24-h.p. car: £34.—Garage, Broadway, Muswell Hill, N.10. Deferred payments arranged. [8230]

RUDGE-MULTI 3½ h.p. 1914 Combination, screen, new Lucas lamps and horn: £48.—Evesham Rd., New Southgate, N.11. [8230]

RUDGE, 1912, free engine model, good running, and well typed, £18; second-hand C.B. and £13/10; must sell.—Tollady, Hemmingford, Bicester. [8230]

1913 Rudge-Multi, 3½ h.p., fitted with lamps, speedometer, horn, mirror: a guaranteed lot: £20.—Wellboy Motor—Garage, Woodford Rd., Forest Gate. [8148]

RUDGE Multi, 3½ h.p., 1912, Millford sidecar, horn, speedometer, perfect condition, not ridden 8,000 miles: £36.—Hutchison, 19, Bragenose St., Chester. [8230]

1915 Rudge-Multi, 3½ h.p., fitted with lamps, speedometer, mechanical horn, mirror, first-class condition throughout, £48.—Wellboy Motor Garage, Woodford Rd., Forest Gate. [8148]

RUDGE Multi, 1914, clutch, overhauled and recased 1917 colour, dark green tank, by Rod March, 1917, lamps, Cowey, 2 new Clinchers and belt, 90-95 m.p.g. on paraffin, £30; also Phoenix 1 sidecar, 2 months old, 29/5; wanted, 2-stroke.—L. 21, The Hall, Tottenham, N.17. [8230]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1917 Rudge Multi, 49 gns.: T.T. Rudge Multi, 27 gns.: 1913 Rudge Multi, 23 gns.: 1913 T.T. Rudge, clutch, 22 gns.: 1913 T.T. R. Philipson, 22 gns.: 1912 Rudge, 2-speed, clutch, 11 (D) [8230]

RUDGE Multi, 1913, fitted for substitute, extra good condition, £33/5; Isle of Man engine model, with large head lamp, and Klaxon mechanical 1914 model, £30/10; Multi, in excellent condition, practically new tyres, T.T. bars, £31; extended payments or exchange.—Service Co., 292, High Holborn, London. [X]

## Scott.

COLMORE Depots, Birmingham, and Manchester Scott motor cycles. [X]

1915 Scott, 2 speeds, Lucas lamps and horn: £20.—Cross, Jeweller, Rotherham. [X]

SCOTT, 1915, and Henderson lightweight sidecar, a little used, and in prime condition: price £20.—Selby, 82, Castle St., Cirencester. [X]

SCOTT, 1911, recently overhauled, new wheels, semi T.T. bars fitted, excellent condition: £20.—2nd Lt. Taylor, Southsea Castle, Portsmouth. [X]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 Scott coach combination, order, 53 gns.; 1914 Scott, solo, 32 gns. (D) [8230]

SCOTT, late 1915, coachbuilt sidecar, screen, h.b.c. excellent order, £60, or close offer: 1914 Bosch mag, coachbuilt sidecar, £50.—Cater, "Aram 15, Wellington Rd., Bush Hill Park, Enfield, N.11. [8230]

SCOTT, 1914, and sidecar, 2-speed, kick start, cyl., 2-stroke, Binks carburettor, Stewart & Co. meter, Palmer cord tyres: £65.—extended payment exchange.—Service Co., 292, High Holborn, London. [X]

SCOTT, 1916 model, with fine Swan sidecar, horn, screen, complete with lamps, speedometer, a including new Palmer cord cover, a fine turnout: price £70.—Advertiser, 63, St. Mary's Rd., Bradford. [X]

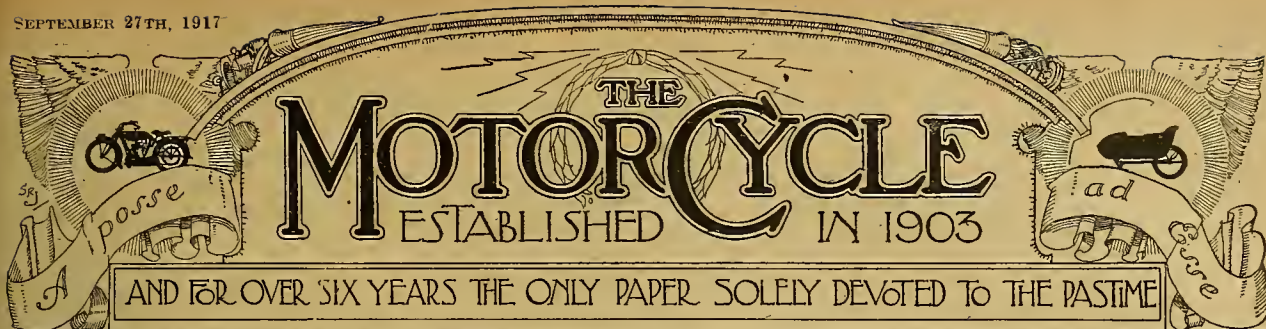
## Seal.

1915 Seal, 8 h.p., 2-seater, wheel steering sidecar, speeds, Lucas dynamo, fully equipped, excellent condition, 60 m.p.g.: £75, or exchange new solo cash. 18a, Pantiles, Tunbridge Wells. [X]

## Service.

SERVICE, 2½ h.p., 2-stroke Peco engine, chain belt drive, 1915, a very reliable proposition, speed, Harcourt extra cooling fins: £55; extended payments or exchange.—Service Co., 292, High Holborn, London. [X]





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### After the War Improvements.

**T**HERE are too many people in the motor cycle world, both makers and users, who consider that motor cycles have reached the stage in which there can be no improvement. This is a very dangerous position to arrive at in any industry, and the subject therefore requires careful study. People are rather too apt to compare the motor bicycle with the pedal cycle. Now, the pedal cycle has reached, so far as we can see, finality, but the motor cycle is a very different proposition, for it is not a simple machine propelled by brute force. No one will contend that the internal combustion engine is perfect, and yet before the war we had motor cycle manufacturers slavishly copying one another, with the result that individuality in design was lacking in most makes.

The war has taught people a great deal, and not least of all those engaged in the manufacture of motor cycles. Firms who confidently supplied the Government with machines at the beginning of hostilities—thinking that they were perfect and that nothing better could be devised—had a series of terrible shocks when the campaign was not many weeks old. Their products, which they thought good enough for an A.C.U. Six Days trial—over roads so bad that the competitors almost struck because of them—failed hopelessly at the Front, and it was discovered that the roads in the war area, which had to be traversed by men whose duty it is to obey and not to ask why, played such havoc with the machines that they were almost immediately thrown out of commission.

The chief lessons which the war has taught us are that for really rough work the ultra-lightweight is unsuitable, as it does not possess either sufficient strength or power, and that the medium-weight machine, which was thought to be ideal, needed a good deal of strengthening and detail improvements in the way of protection both for the rider and for the external

working parts. The conditions of warfare have proved the enemy of the lightweight, and have resulted in the strengthening of the medium-weight machine. There are points, however, which the war has not cleared up. It has done nothing to make motor cycles more silent, nor has it improved their flexibility—two items which need serious attention. It is all very well for an individual rider to say that he does not mind noise, but he is not the only person to be considered; he has to think of others who do, and yet again others who do not, use a motor cycle.

Then comes the question of flexibility. The motor cycle has a great deal to learn from the car, as the car was developing rapidly at the period when the motor cycle was progressing with tortoise-like speed. The type of carburetter required is one which is reasonably economical, gives ample power when the throttle is fully opened, enables the engine to be started at the first push, and also permits of an ample degree of flexibility.

The two points to which we have specially drawn attention have a strong bearing one upon the other, as it is very often the case that the lack of flexibility necessitates the machine to be kept running fast, causing it to make much more noise than it would do if it were throttled down to a reasonable extent. The ultra-modern expensive motor bicycle of medium horse-power which is to be seen at the present time in ones and twos does not possess these faults. They have been entirely eliminated from it, so we are suggesting not merely theoretical improvements but improvements which have actually taken place.

There is yet another point which we have continually advocated, and that is the general adoption of the spring frame. It behoves the A.C.U., therefore, to bear in mind that when the time comes for the discussion of another six days trial special marks should be awarded for silence, flexibility, and springing—items that up to the present have been sadly neglected.



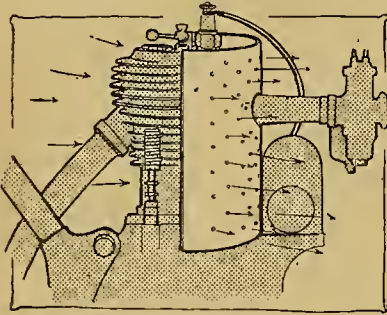
# IDEAS: Useful and Ingenious.

Gray R. Jones



## A COOLING DEVICE.

HAVING been a reader of *The Motor Cycle* for some years, and taking particular interest in the tips given therein, I have pleasure in contributing the enclosed original idea, which practically speaks for itself. I am certainly in receipt of benefits that otherwise cannot (by me) be obtained, viz., a cool



A cooling device which has proved effective in the case of our contributor's engine.

cylinder, low petrol consumption, a somewhat novel leg warmer, and running of machine much improved. The apparatus is in practice extended much more than is shown in the sketch.—JOHN HENDON, Epsom.

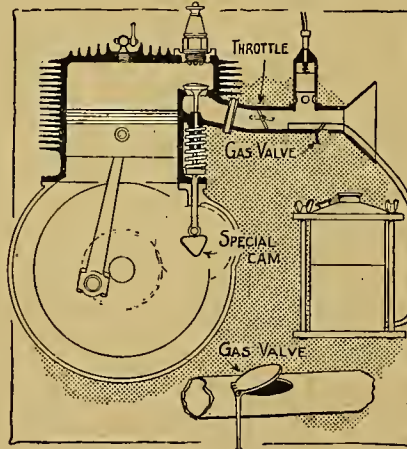
## AN ACETYLENE GAS ENGINE.

AS the shortage of petrol is becoming worse it really seems as if we shall have to run motor cycles (if we run them at all!) on something quite different from petroleum. Acetylene gas might be a good alternative, but it seems to be greatly feared on account of its being spontaneously explosive at a pressure of 30 lb. per square inch. In the accompanying drawing I have attempted to design an engine for running on acetylene gas. It will be seen that it has an unusually large bore and a correspondingly short stroke. The inlet valve has an extraordinarily shaped cam, and is timed to remain open until near the end of the compression stroke, so that the gas may not be compressed above a very small degree, and, since the bore is so large, there will be plenty of gas left inside the combustion chamber to effect a powerful explosion (when necessary). On an engine of this kind there would, of course, be no carburetter. The acetylene gas would be introduced by means of a flexible pipe protruding a few inches into the induction pipe and fastened to it. An extra air inlet would also be fitted as shown.

By using acetylene gas in this way it would be necessary to provide some means for increasing or restricting the

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Rough sketches will suffice.

amount of acetylene gas as required, otherwise too rich or too poor a mixture might frequently occur, with no remedy for it. A simple though slightly extravagant means of doing this would be to have a valve near the end of the acetylene gas pipe, which would restrict the amount of gas either partially or totally, and at the same time open an air passage for the gas to escape, as shown in the drawing. (The reason for this air escape is, of course, to avoid compression of this very explosive gas.) The gas valve above referred to would have to be



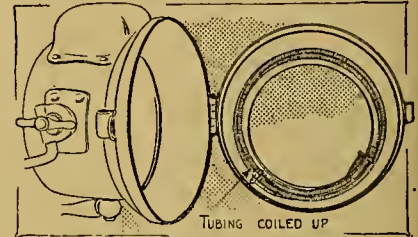
A suggested design of engine for the use of acetylene gas.

operated by a Bowden wire controlled by hand or by governors driven off the engine, but the latter would incur certain complications as to starting and slow running. I hope this idea may be of some use to your readers.—C. L. WHATLEY, Malvern.

## TO PREVENT SPLIT TUBING.

THE greatest inconvenience of the average rubber tubing used for connecting the lamp to the generator is its liability to split at nipple ends. This splitting is caused by the endless vibration set up when the tube is in position. The obvious cure is to keep the tubing detached, save when in actual use, whereupon the difficulty crops

up as to the finding of some suitable position. Having tried various methods, I have ended by discovering one really safe and accessible holder, viz., the lamp. Inside the front lens door of every motor cycle lamp will be found a circular piece of metal, which projects anglewise from the door body. By coiling the tubing two or three times round inside this V, an ideal position is obtained. The connection is then in



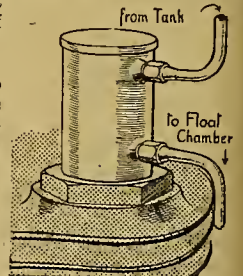
Carrying the rubber lamp tubing when not in use inside the flange of the door is an economical hint.

variably to hand at a moment's notice. It can never be left at home, and no toolbags, locks, or straps have to be undone to obtain it.—R.M.A.

## HEATING HEAVY FUEL.

I HAVE fitted up my 1914 Triumph with an apparatus for vaporising substitutes that may be of interest to some readers. I got a piece of  $\frac{1}{2}$  in. gas

pipe, brazed it into the recess of the valve cap, brazed a top on it, and also two unions on the side. The substitute comes from the tank, drops down on a hot cap (this helps greatly to cool the engine), then flows from there to a three-way piece on the ordinary pipe from the tank to the carburetter. I may say I am using the injection tap on the tank to feed this, and not interfering with the ordinary tap.—G. MORRISON, Glasgow.



An extremely simple idea for heating heavy fuel.

## NOISE IN ENGINE.

SOMETIMES a rider is distressed to notice a kind of subdued grinding noise proceeding from his engine. It is more than probable that the chain which drives the magneto is a shade too tight. To remedy this, the timing need not be disturbed; it will be sufficient to slack back the nut under the magneto base-plate, and to slide it bodily a fraction of an inch towards the engine.





### Our Rivals, by Comparison.

AT various times two nations have challenged and—temporarily at any rate—beaten us in the motor cycle markets of our own Colonies, viz., America and Germany. The German-built N.S.U. was at one time the most popular Colonial machine; various American machines, notably the Indian, had us whopped to the world in many Overseas markets. In neither case were the machines superior in quality, price, or accessibility to those we exported. The N.S.U. perhaps owed its temporary supremacy to the fact that it was equipped with a goodish variable gear long before British makers took such things seriously. The Americans owed their supremacy—still unbroken, by the way—solely to their superior interpretation of “service.” When the war ends, we must aim at supplying the man who lives in a colony, dominion, or dependency along the lines of a policy which deserves a paragraph to itself.

### The Ideal Export Policy.

THE machine for the export trade is really fairly simple in its main essentials, and the following five points seem to me to exhaust the requirements of a sound policy for Overseas trade:

1. The machine must be designed for Overseas conditions.
2. It must be of first-rate material and workmanship.
3. It must be as cheap as any potential rivals. (Cheapness embodies quality as well as price; no bad machine is ever genuinely “cheap,” even at £25.)
4. It must be designed for amateur management.
5. It must be introduced, pushed, supported, and maintained by first-class local “service.”

### For Amateur Management.

IN this respect, the maker who caters for Overseas trade is, between the devil and the deep sea. Home experience has led him to suspect the tinkering amateur and to hate him like poison. So the typical manual and tool kit are not planned to assist owners in any job much more exacting than decarbonisation; and this policy has its merits for the home trade, seeing that telegram and train could before the war summon replacements within twenty-four hours, and that crack mechanics are always available near the owner's home. Overseas trade is fundamentally different. The spares at the best may be separated by weeks or by hundreds of miles from the owner, even if a full stock is maintained at two or three centres in the colony. Expert assistance may be absolutely out of reach. A policy which aims at hampering and curbing tinkeritis is fatal in the Overseas trade. The Overseas manual should be written to train owners in performing every job which can conceivably arise. The tool kit should be planned to render the manual operations of all these jobs as simple and easy as possible. Nay more: the machine

itself must be designed to enable the owner to tackle jobs which a British provincial garage would refer to the factory.

### The Machine of To-morrow.

SOME of us do not realise what advances are possible. Picture yourself as resident in one of our less developed Colonies, perhaps 300 miles from railhead, with a big mileage to cover, and roads which may not admit of sustained speed, but are at least rideable. You consider the pros and cons of a motor cycle. You can rely on every detail of the machine, except the magneto, engine, gear box, and clutch. Every other part is simple to comprehend, repair, and adjust; with a few spares in reserve you need not worry about them. What of the four vulnerable items? Well, the modern magneto is, as a rule, trustworthy for five years; that is good enough. The engine will need new bearings in some parts annually; well, the newest roller bearings do not wear in 20,000 miles; in other words, a crack 1918 engine need not go into the repair shop for five years. The clutch? It is a simple matter for a maker to endow that with a quinquennial longevity, barring a new plate or so; but some 1914 clutches were not of that type. The gear box? Well; that at present is the trouble. Another member of the staff and myself each owned 1916 models of a leading machine, and we have run through four gear boxes between us! But it is evident that in the near future the British trade can, if it likes, produce a machine which could give five years' hard service in Central Africa without once travelling down to a repairer on the coast.

### Two v. Three-speed Gear Boxes.

SO much trouble has arisen with modern three-speed gear boxes from the hub type upwards that it is clear the trade has been in rather too big a hurry to cram three gears into the very restricted space available at the countershaft position. This space, already so short, is being further abbreviated by spring frames, many of which have a pivot hinge just behind the gear box, which demands a largish bearing and accessible lubricators; indeed, makers are beginning to abandon the movable gear box for front chain adjustments and to substitute a movable engine. Three speeds are, of course, our ideal just now; and I much dislike retrograde steps. But it is obvious that a reliable two-speed is preferable to a three-speed, which consists of a puzzle of flimsy, watchlike works, or which has such narrow clearances that it is an hour's job to readjust the control after sliding the gear box for adjusting a chain. After all, such firms as Enfield and Phelon-Moore have built up enviable outputs on the two-speed. The maker who has his eyes on the export trade will do better to market a simple, reliable, and foolproof two-speed, than to turn out three-speeds which are not quite perfect. A two-speed, moreover, is considerably improved by the chain-cum-belt drive, with an adjustable pulley.



## The First Thousand Miles on a Flat Twin Brough.

Overhead Valves; 70 × 64.5 mm. (497 c.c.); Sturmev-Archer Three-speed; Amac Carburetter; Thomson-Bennett Magneto.

THE Brough is the first flat twin over 400 c.c. the writer has owned, and this is no picked sample to be discussed. In fact, it is rather the opposite, for when the machine left the works it had not even undergone a road test. It is a standard overhead valve model, fitted with semi-T.T. bars, and it may be added that since new it has received no tuning whatever, and has required none—in fact, it has not even been cleaned! As regards adjustments, the overhead valves, the steering head, and the belt are all that have been touched, and the only mount to compare with it for real sport and exhilaration was a T.T. Scott of 1912, which scored over this machine only on hills.

One great charm about the Brough is that it can be ridden at very high speeds without imparting the least sensation of revs. The couple is imperceptible, the balance throughout very near perfection, and it will sweep along at 50 m.p.h. with as little apparent effort as at 25 m.p.h.

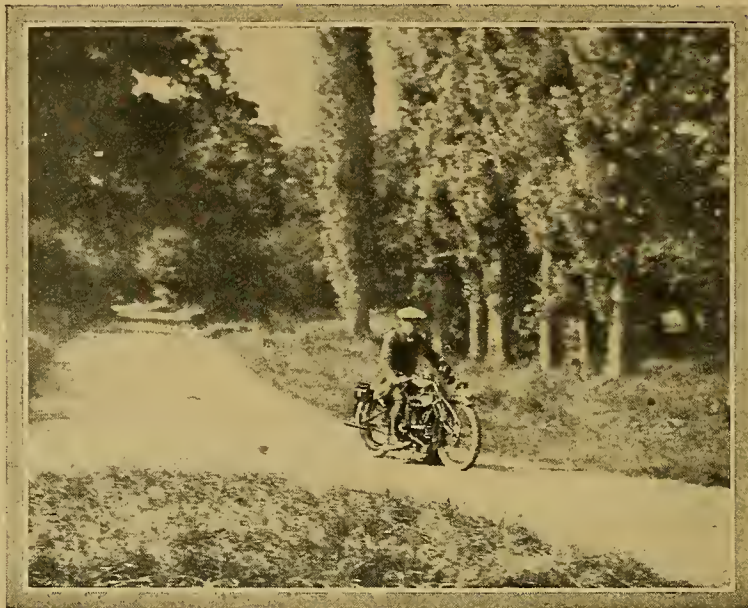
### Speed Comparisons.

Comparisons are odious, but none the less useful. On several occasions the Brough has been ridden alongside works-tuned singles for the purpose of speed comparison, and it was found in every case that the flat twin was considerably faster on anything but bad

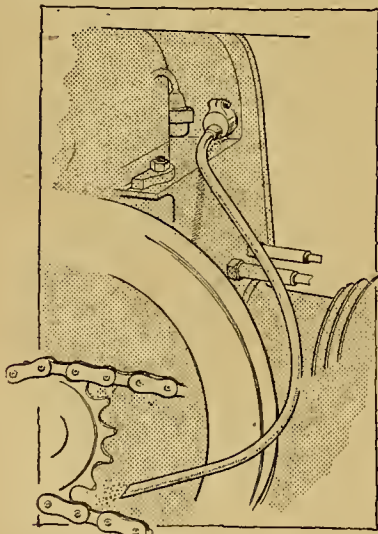
hills. This is borne out by the average speeds maintained on long business trips. Riding the Brough at a comfortable and natural speed on a ninety-mile journey, it maintains a higher average by 6 m.p.h. than a good single ridden similarly at its natural touring speed, and it must be borne in mind that the Brough has undergone no special tuning, and is probably not yet at its fastest. Its most comfortable touring speed is an average of 30-33 m.p.h.; 37 m.p.h. has been averaged on a ninety-mile journey over

wet roads in the very early morning. It will touch 40 m.p.h. on its middle gear of 7.32 to 1 (an engine speed of 3,700 r.p.m.), and at full throttle on a slight up grade on top gear the speedometer needle wavers between 58-60 m.p.h. (3,200 r.p.m.).

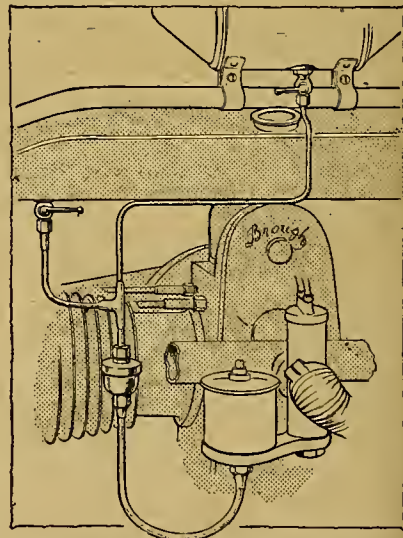
On hills the Brough is no great guns. It lacks a gear between the top and the middle. The gap between the 4¼ and the 7.32 ratios is too great; if there were a gear between these two, and the change could be made at 30 m.p.h. by a movement of the foot, this machine would leave any touring single standing even in the mountains, for it is not supposed to be a top gear machine in any sense of the word. Still, when once it has found its feet on middle gear it is faster on, say, a 1 in 10 gradient than most tour-



The 3½ h.p. flat twin Brough on the road at Stoneleigh, near Leamington.



The crank case release is often arranged so that it breathes oil vapour not only on to the chain but on to the belt. By bending the overflow pipe as shown this nuisance is cured.



Showing the provision made for using heavy fuel. The filter bears hard against the cylinder fins, warming the fuel before it reaches the float chamber.



**The First Thousand Miles on a Flat Twin Brough.—**

ing machines are on their top ratios, but, as every practical rider knows, a big drop down spoils the running of an engine for several yards, as it takes some seconds for the traces to tighten. The bottom gear, which I have not used, is 12.6 to 1.

**Reliability.**

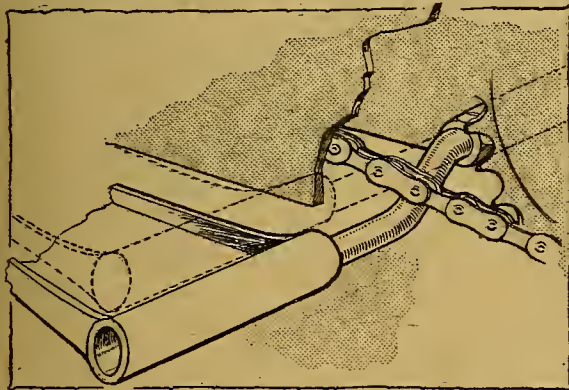
To assume a critical and scathing attitude is generally easy; to be frankly enthusiastic is the opposite. It is difficult to speak too highly of the Brough engine, both as regards its running and its workmanship. The overhead valves are no more noisy than the side-by-side valves of many a 5 h.p. V twin of repute. Naturally, they require careful watching if maximum results are to be achieved, but I believe them to be practically unbreakable, and even should one break no serious damage should ensue.

The Brough is not the ideal machine for the tyro. Judgment is required in at all times keeping up the revs., and the engine must be judiciously lubricated. Yet in spite of the lightness of the engine parts and the exceedingly high speeds it is capable of attaining and maintaining, it can safely be set down as a no-trouble machine. Though I have now ridden well over 1,000 miles, and this the first 1,000, nothing has shown the least desire to depart from its place of anchorage, and the machine has received an absolute minimum of attention.

The material and workmanship on the machine throughout are up to average high-class manufacture, though naturally there are a few points to criticise.

**A Few Criticisms.**

One oversight in the design is in the position occupied by the back footplate stay, which is placed so that, unless the chain be adjusted undesirably taut, it comes in contact with this stay on every pot-hole. This causes a "mysterious rattle," and can only be altered by the laborious task of cranking the stay—



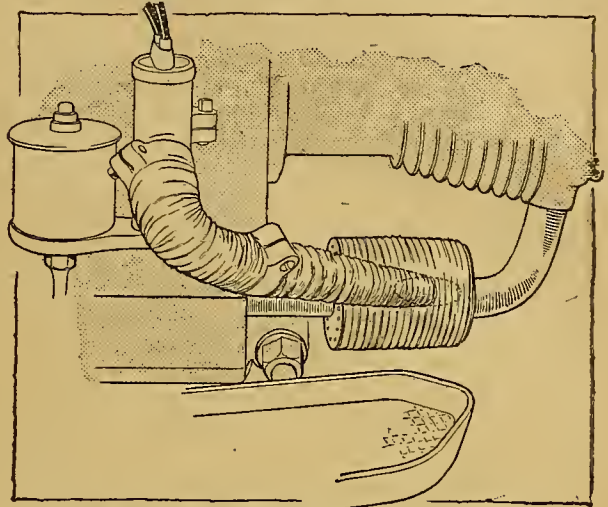
By dropping the footplate slightly, rattle caused by slack chain is eliminated.

the sort of alteration the purchaser should not be called upon to perform.

Another point I would criticise is the tank filler caps. Possibly I have run foul of some makeshift war time material, in which case the criticism carries no weight, but on my machine both filler caps leak abominably. Until I made alterations in the ventilating provision petrol was lost wholesale, while oil still oozes freely from the fo'c'le filler cap, giving the tank a most

unclean appearance. Moreover, it is well known that fine threads on wide bosses are an abomination, and the first garage boy to replace my filler caps put them both on cross-threaded!

With the semi-T.T. bars the steering and balance of the Brough are as near perfect as one could wish.



The muffler encircling the exhaust pipe consists of a paint tin, the inlet holes being drilled at the back end only.

Owing to the length of the engine, however, there is an unusual rake on the steering head, which means that this member must be carefully watched for slack, particularly during the first thousand miles.

The design of the steering head would be very much improved as regards durability, etc., if the bottom thrust bearing were larger and stronger, or, better still, if a journal were used in addition to the thrust. This, however, applies to scores of other machines, though it applies particularly to the Brough on account of the abnormal rake.

**Petrol Consumption.**

The engine is clean externally, this being largely due to the sensible dimensions of the crank case release valve, which maintains the vacuum inside the crank case. Another attractive point is the ease with which the engine starts. The first kick is generally successful, even without the wastage of a preliminary flooding—a habit to be avoided in these days. Petrol consumption, on the occasions when I have tested it, has worked out between 70-80 m.p.g. when maintaining an average of just over 30 m.p.h. On one occasion, riding slowly with a 10 stone passenger on the carrier, we did 88 m.p.g.

**Gear Box and Clutch.**

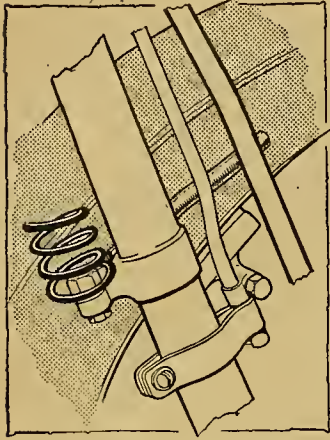
The Sturmey-Archer gears, though delightful to handle, are decidedly noisy, and when the machine was new I was surprised at the stiffness of the h.b.c. clutch in comparison with a Sunbeam. This, however, was soon remedied.

It should be borne in mind that these gear boxes are turned out for any type of machine up to 9 h.p., and the clutch, therefore, when screwed right up, possesses gripping qualities sufficient for the most powerful motor cycle engine. But the rider of the machine can easily slacken off the springs to suit the power of his engine; testers generally overlook this



### The First Thousand Miles on a Flat Twin Brough.—

point, with the result that there are scores of  $3\frac{1}{2}$  h.p. machines on the road the clutches of which require an unnecessary amount of hauling out. On my machine I have slackened off all six springs till the heads of the screws are flush with the outside plate,



A mysterious rattle, so difficult to locate, is often caused by the valances vibrating against the fork. Three inches of high-tension cable placed as shown makes an efficient insulator

and the clutch is now pleasingly light to handle. If the clutch is too lightly adjusted, slip can generally be felt if one's weight be thrown upon the kick starter against compression.

When the engine was new it was kept aswirl with oil, and a good deal of trouble with the back plug was experienced as a result. If too much oil be used, the back cylinder obtains an excess before the front, otherwise there is nothing to complain about. The automatic drip feed, dependent on crank case suction

and assisted by hand pump, has proved entirely satisfactory.

"Ixion" favours cool-running plugs for this type of highly-efficient engine, but, curiously enough, my experience has proved entirely contrary to his. After much exploring, I have hit upon a plug which gives unqualified satisfaction—the Oleo Aviation plug. This is a very small plug, having fine platinum wire points which protrude into the cylinder. With this plug no suggestion of pre-ignition has been experienced even on my most cherished blinds, and while the engine runs better on these plugs than on any other tried, they have the great additional advantage of burning their fine points clean of oil, whereas the heavy electrode type caused many an involuntary stop.

No-ordinary touring plug proved itself good for more than 300 miles or so. At the end of that period misfiring began, and cleaning the plug effected only a temporary cure. Also, before hitting upon the Oleo porcelains were broken galore. A very satisfactory plug if it were readily obtainable is the Reliance racing plug, the fine platinum points of which are *embedded* in the insulating material; it also possesses the attractive feature of being easily taken adrift for the purpose of internal cleaning. This plug proved itself the only thing for the Scott T.T. engines, and personally I have never found much to complain about in fine wire point plugs.

### Outside Controls Favoured.

My first act on taking delivery of the Brough was to move both inverted levers and inside wires, and to arrange everything on the surface. Buffalo horn grips with hook ends were fitted, and these have added enormously to the comfort and perfection of control.

### Petrol Substitutes.

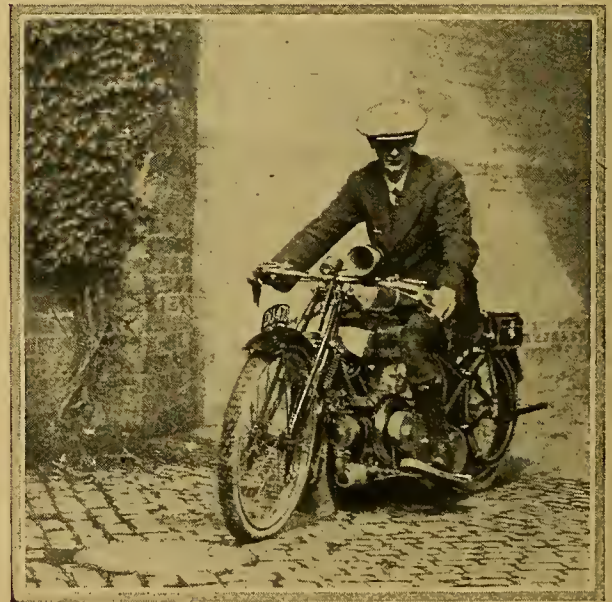
Many business trips have necessitated supplementing the petrol supply on occasions with one-third substitute. I was a bit frightened of this on account of the long induction pipe, though the engine was found to start up quite easily on this mixture.

By way of special provision, the Amac carburetter was fitted with a more efficient hot-air intake than the original, which merely skimmed its supply from the top of the aluminium silencer. A stiffly-made 1 lb. paint tin, the hole in which happened to be the same size as the exhaust pipes, was arranged to fit over the front exhaust pipe. Air holes were drilled in the end of the tin, facing backwards, while at the side of it another hole was drilled to admit the end of the pipe from the carburetter. Finally, the muffle tin, air pipe, and the entire length of the induction pipe were lagged with asbestos twine, then bound with a waterproof coating of adhesive tape.

This provision has proved sufficient to ensure absolute safety with the heavy mixtures used, and the whole carburetter and induction pipe are soon warmed. The arrangement holds itself together, and it can be taken adrift in a few seconds.

### An Ideal Solo Mount.

The mudguarding is moderate. In very wet weather the belt, of course, slips, but this transmission, together with the wonderfully smooth pulling of the engine, is delightful in dry weather, and should lead to almost eternal tyre wear.



The machine on which the experience was gained. It has overhead valves and an engine of  $70 \times 64.5$  mm. (497 c.c.)

It was found necessary to attach a leather flap extension to the front wheel mudguard in order to protect the overhead valve mechanism of the front cylinder from grit thrown by the wheel. This is a fitting which might advantageously be made standard.

The Brough is very low in build, and as regards general lay-out is a most attractive little solo mount. Personally I wish for nothing better.

CHINOOK.





## A Commentary based upon Practical Experience and a Study of Overseas Opinions.

**American Features.** TEN years of globe trotting does not always tend to help a man view leniently the Old World order of doing things.

As a rule, the young Englishman who visits a new country falls in with the idea that the average British tradesman and manufacturer is a pottering old fool just as readily as he falls in with the use of the local slang, and in this direction it is really extraordinary how, after six months in Canada, for instance, the best bred English boy appears to forget the niceties of his mother tongue, and adopts by preference the method of ramming home every other observation by the addition of a "sure" or "you bet your life."

Somehow the novel appeals to the Britisher more strongly than to other nationalities; but he is very apt to accept as novel—especially in the motor cycle line—certain things which merely appeal as such because they are not in accordance with current British practice. Many of our readers have held up as novel and desirable certain practices in motor cycle engineering which exist to-day in the States; but were the memories of such correspondents as long as our own they would recall that this self-same feature was once common on British machines, but that it was discarded because something was arrived at which, on the whole, was better.

Take, for example, the loop frame, which is to-day a "feature" of most leading American machines, just as at one time it was ordinary practice in England. That the loop frame has decided advantages we admit, but it has also its disadvantages, which is proved by the fact that most of the oldest and most experienced engineers of the world have abandoned it—except in lightweights—in preference for a system whereby the engine itself helps to support the structure. The loop frame happens to fall in nicely with American lines of design; but we incline towards the view that a heavy engine supported American fashion takes more watching as regards its security than one which forms part of the frame structure. Indeed, we have many times ridden American machines which vibrated excessively simply because the engine fastenings were a shade on the loose side, having relinquished their virgin tightness of grip with the running in of the engine—this being one of those little points the everyday rider does not look for. This weakness may not be inherent to the loop frame, but it goes to prove that the American system of fixing—loop or otherwise—is not superior to our own.

That, then, is but a single point selected as one which is often taken to illustrate the superiority of American machines. We were hoping to keep out of

the American *v.* British controversy, for comparisons of any kind—especially one involving a friendly country, to whom we already owe more than the man in the street realises—are not in the best of taste, but the subject is one which so deeply concerns our Overseas readers that we are constrained to express the opinion that, saving in certain details, the American manufacturer is certainly not ahead of the British.

There is just one point more, namely, that those who hold up American machines as superior to our own are almost invariably home riders. Nine letters out of ten from the genuine Overseas rider are from men who want British machines in preference to foreigners, and who implore British makers to waken to the realisation of Overseas markets. In England we have our wide range of choice, so naturally there are a few who plump for the American; but the man Overseas knows what he wants and asks for it—the British goods when obtainable.



### The Old Order and the New.

RECENTLY a young Colonial subaltern idled away a few days in an old-world market town, such as the exile abroad often dreams of. Many years had elapsed since last he visited this place, but its old scents and sounds bridged the span with a single bound. He forgot the many nights spent chatting with a brandy-sodden planter on the mosquito infested verandah of a low-lying bungalow—chewing the end of a damp cigar and wondering whether this particular liquor was the sort they distil from potatoes. He forgot that little brown bug which bites like fury and which leaves its head behind if you pull it off—forgot even the grey, percolating chill which settles just before the dawn over those eternal mangrove swamps. Here were the old familiar scents and sounds of ten years ago—no shortage of grub, no insects, everything as it should be, and no one, apparently, out to make money in any way possible and in the shortest possible time.

In the North and the East men are content to give up everything for a certain period—to live a life worse than a convict's, save that they are free, but this is not so in the old market towns of England. Here things progress at the same leisurely trot year after year. No one has any thought of building up a huge pile in a few strenuous summers, then dropping it for good. Men prefer to make their work the leisurely affair of a lifetime, going ahead just as dear old grandpa did, and with no thought of quitting till finally they join grandpa under the green apron of



## Overseas Section.—

Mother Earth, when they will cease to have a say in the matter.

Anyway, here were the old familiar scents and sounds—the scents emanating chiefly from Brown's hostelry, as of yore, the sounds from the upper loft window of Clark and Sons, the corn merchants, who evidently still use the same old chaff-cutter with the

"Yes, sir. She serves me fine. Does the work of two horses, and—— What, is it *you*, Master 'Arry? Lor' 'ow you *have* grown!"

❖ ❖ ❖

**Gear Control.** ONE distinct advantage of the selective clutch gear, on the lines of the P. and M. and Enfield, is that one lever only is necessary.

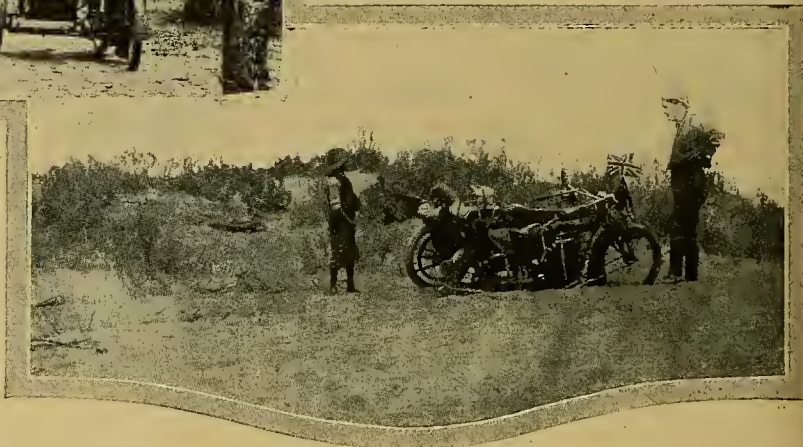
With the gear box and clutch system one has to remove one hand from the bars to grasp the lever at the same instant as weakening the command of the bars by hauling out the handle-bar clutch. If the clutch is foot-operated the disadvantage of operating two controls simultaneously still remains, for on rough going it is almost as necessary to keep one's feet firmly planted in the most natural position as it is to maintain firm grip of the bars. In spite of its two levers, however, the modern gear box arrangement with its handle-bar clutch is undoubtedly the goods for perfect control. The gear can be thrust home, and the machine manipulated over the roughest of going by gentle movement of the fingers, and



#### SCENES IN SOUTH AMERICA AND SOUTH AFRICA.

(Top) A tropical grove in Brazil penetrated by riders from Rio Janeiro. The motor cycles are Premiers and Indians.

(Bottom) Dry river beds are among the drawbacks encountered on long journeys in South Africa. The rider is evidently considering the weighty proposition of moving a heavily-laden outfit from the axle deep sandy rut.



loose handle. Apparently nothing had changed, but—stay, what is that opposite Robertson's, the grocers—"Robertson who swore he'd see me in jug because my brand new Excelsior frightened his van horse into the ditch, and who purposely sacrificed the family custom simply because one hare-brained member of the family rode a motor cycle?"

"Halloa, Robertson! Come round to motor cycles after all?"

it is only when a hasty change falls necessary at an embarrassing moment that the inconvenience of the two controls is felt. Then, assuredly, it would relieve matters if one could tip the gear in by toe, and certainly it would be a refinement if an extra control were provided by which the rider could move the gear from bottom to middle and the reverse with his foot. A duplicate foot control for the top gear would perhaps be superfluous.

#### A Selection of Letters from Readers scattered all over the World.

##### The Best Type of Sidecar Machine.

An interesting criticism from the REV. A. M. WALMSLEY, Kandy, Ceylon:

"May I, with all humility, trespass on your space to say something on the following subjects:

"1. Weight and Power of Sidecar Outfits.—The article by 'Chinook' in the issue of May 31st was most interesting, but his conclusions, drawn from the table on page 492, were certainly quite contrary to my own experience. 'Chinook' there claims that the medium-powered outfits are better powered than the 6 h.p. heavyweight, and decries the money wasted on extra oil, petrol, and tyres. He clearly advocates sidecar outfits such as the 3½ h.p. Brough and 4 h.p. Douglas, 'in preference to the huge 6, 7, and 9 h.p. outfits.' As it happens, I have driven a 3½ h.p.

Brough with featherweight sidecar, a 4 h.p. Douglas with Canoelet coachbuilt car, a 4 h.p. A.J.S. with A.J.S. car, a 4½ h.p. James with Phoenix cane car, a 6 h.p. A.J.S. with A.J.S. car, and a 1917 Powerplus Indian with an Indian sheet steel car. My conclusions on the comparative behaviour of these outfits are based chiefly on trips made over three of our main roads:

"(a) Colombo to Kandy, seventy-two miles. Rise of over 1,600 feet, mostly in the last twenty miles.

"(b) Anuradhapura to Kandy, over eighty miles. Rise of 1,300 feet, mostly in the last thirty miles. Usually done, as it happened, in the teeth of S.W. monsoon.

"(c) Kandy to Nuwara Eliya, forty-eight miles. Rise of 5,000 feet, of which 3,000 feet have to be climbed in almost the last ten miles of journey.



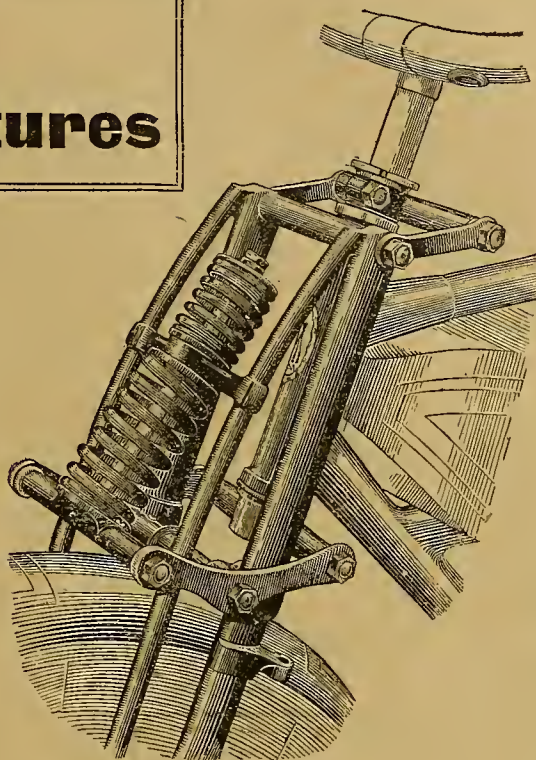
## Some B.S.A. exclusive features

No. 3.

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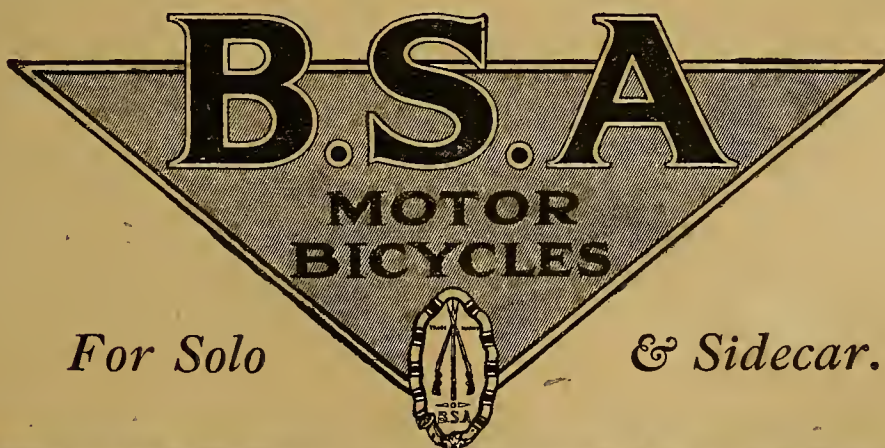
**H**OWEVER bad the road, the B.S.A. Spring Fork absorbs the shocks and ensures comfortable riding. Its efficiency is giving the utmost satisfaction on the shell-torn roads of France, and the tracks through desert and forest of German East Africa.

In pre-war days—in the Tourist Trophy races and other events where phenomenal speeds were attained on ordinary roads—the B.S.A. Spring Fork proved wonderfully successful.



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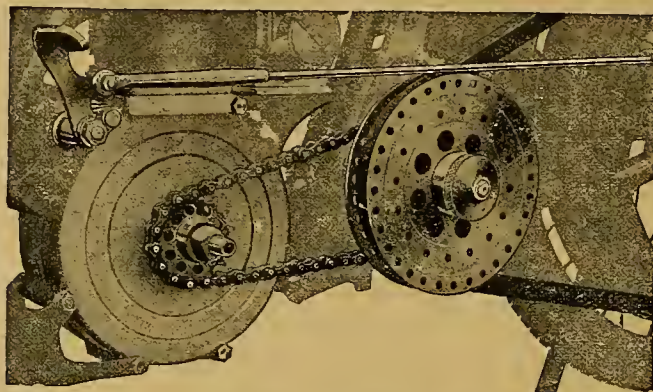




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**Overseas Section.—**

"These journeys have been taken non-stop, or practically so, at a good average speed, and the hills have been tackled with a hot engine. Results as follow:

"3½ h.p. Brough.—Hopelessly under-powered. Could not accelerate after going round hairpins dead slow on a severe gradient.

"4 h.p. Douglas.—As above, but not as bad. Once, however, seized in front cylinder.

"4 h.p. A.J.S.—Much better, probably due largely to lower top gear and less necessity for keeping up 'revs.' in order to accelerate—a necessity with both flat twins above.

"4½ h.p. James.—A good steady plugger, but rather slow on hills, and too 'chuggy' at slow speeds. Needs the backbone of a crocodile!

"6 h.p. A.J.S.—Very satisfactory, but in middle gear (8 or 9 to 1) very slow.

"Powerplus Indian.—Takes everything fast without a grumble.

"Thus my own experience coincides practically with the experience and table detailed by Mr. Lomas in your issue of June 21st, on page 574. One is almost tempted to ask if 'Chinook' has ever *seen* a real hill! Certainly, I think, if he had to yank a sidecar up 5,000 feet of hill before breakfast, as many of us do, he would drop his 3½ h.p. baby after his first konk out, miles from anywhere.

"2. Then about shock absorbers, mentioned by 'Chinook' in the issue of June 21st. He wants a 'foolproof and accessible mechanism, permitting a convenient range of adjustment—of the plate clutch type—so arranged that when the screws are slackened off the adjustment is approximately correct, while any tightening of the screws increases the friction of the plates, and thus solidifies the drive.' Is not this an almost correct description of the hand-controlled clutch on the Indian? Sometimes I am trickling along, solo, under light load, on pilot jet; at others I am hauling a sidecar and three up over the crest of a hill. The Indian clutch can be immediately set just where it is needed, so that under all conditions of road, load, and speed transmission shocks are absorbed. Why do not English manufacturers make a similar clutch?"

**Two-stroke or Four?**

T. A. TAYLOR, Mandalay, Burma, writes concerning two-strokes: "I have read your excellent article—'The Critics'—on 'Two-stroke or Four' in your issue dated May 31st. Two-stroke machines are becoming more and more popular in Burma. There are, however, several points which require attention for such places where the shade temperature reaches 110° F. and where the roads are indifferent. Two-stroke machines run very hot out here, even when running on the level at twenty miles per hour, and the cylinders and sparking plugs should have specially large cooling fins fitted to them. One would also like to see the power raised to 3 h.p., a spring frame sufficiently strong to take a light wicker sidecar along level roads, also 26×2½ in. wheels. My present mount is a Baby Triumph, and is, I believe, about the best of its type. I have often run on it to a hill station, where one has to climb 3,600 ft. in twenty miles, and you can imagine how I long for a 3 h.p. Baby Triumph with a spring frame when doing this trip. The easy starting, simplicity, reliability, pulling capacity, comfort, and petrol lubrication of a good two-stroke make it much to be preferred to a four-stroke, and I anticipate its life to be longer. My machine has now done 5,000 miles, and is running better than ever before."

**High Prices in Java.**

MR. ERIC VAEN, Internationale C.H.V.R., Sourabaya, Java, writes: "As during the rainy season (October to May) we have often the highways flooded even half to three-quarters of a yard deep, it would be desirable to have the magneto placed in a higher position. I had my condenser quite spoilt when on a trip of 100 miles last rainy season. I had to pass six fords, and it cost me much money for a new condenser.

"The smooth running of the J.A.P. motor is indeed marvellous; it ticks over quite regularly on top gear at a speed of 6 m.p.h. with sidecar and passenger, and with full throttle it will do 50 m.p.h. All the time I have had this machine I have never had to bother about the motor, and I frankly declare that, with the hand-controlled clutch, the solid gear lever and automatic oil feed, and not the

least of all, the good British workmanship, I really prefer this machine to any of the American motor cycles which are now becoming so popular out here, the Harley (a good machine) included. Also the method of attaching the sidecar is very effective, and yet permits of a ready detaching and fixing.

"As to prices, it may interest you to learn that the combination, fully equipped with big Lucas lamp and horn, was imported and sold new at £135. I bought it second-hand from the owner, who had nothing but misery with it (which is a mystery to me), at £90. Harley-Davidson machines with electric lamp and horn are sold here at £106, and Indians electrically equipped at £98."

**Overseas Agents.**

PTE. HAROLD CHAMBERS, Hampshire Regt., Kasauli, Punjab, India, writes: "Your very welcome 'Blue Cover' of May 31st, 1917, is before me as I write, and, although rather belated as regards date, is nevertheless very much appreciated, and its news eagerly devoured. My motoring friends never fail to call and see me immediately the home mail is delivered, all eager to see the latest 'tit-bit,' and are exceptionally keen on the Overseas Section. This section is a very good institution, and I can assure you is much appreciated out here.

"It has been noticed and commented upon that very few advertisers give a list of their Overseas agents in their advertisements. If you could draw the attention of manufacturers to this fact you would earn the gratitude of many readers in India especially.

"I am requested to send you the best wishes for the future of the good old *Motor Cycle* from a large number of 'boys' out here."

**Petrol Consumption.**

MR. J. W. ANDERSON, Changsha, Hunan, China, writes as follows on the question of petrol consumption: "Two of my American friends here, having read the issue of *The Motor Cycle* dated April 26th, 1917, had a heated argument with me on the article headed 'An Economical Two-stroke,' appearing on page 381 of that paper.

"Of course, being Americans, they are rather hard to convince, and cannot conceive of any motor cycle doing anything like 155 miles to the gallon, even without the several starts mentioned in the above article.

"I would esteem it a very great favour if you could give me some authentic figures as to the highest mileage per gallon of some of our standard machines, such as the 2½ h.p. Douglas, 2½ h.p. Enfield, 3 h.p. Matchless, or 3 h.p. Williamson, as compared with the mileages of some of the American machines in our country, such as the 7-9 h.p. Indian, 3½ h.p. Indian, 7-9 h.p. Harley-Davidson, and the 7 h.p. Excelsior, and lightweights.

"I have been out here for the past four years, and since I left Scotland there have been some very drastic changes in motor cycles, so that I have now no idea as to how they use up the gas.

"Although 155 miles per gallon is rather a high figure, still I suppose nowadays it is a common thing for lightweights to do 120 miles per gallon.

"The arrival of your paper is a weekly pleasure, and keeps one up to the scratch, although we cannot get any cycling around these parts at the present time, but have hopes of having the finest road in China before long. It will be 160 miles in length, if finished."

[On the 27th September, 1913, the following results were obtained in the Sutton Coldfield and Mid-Warwickshire A.C. Petrol Consumption Test:

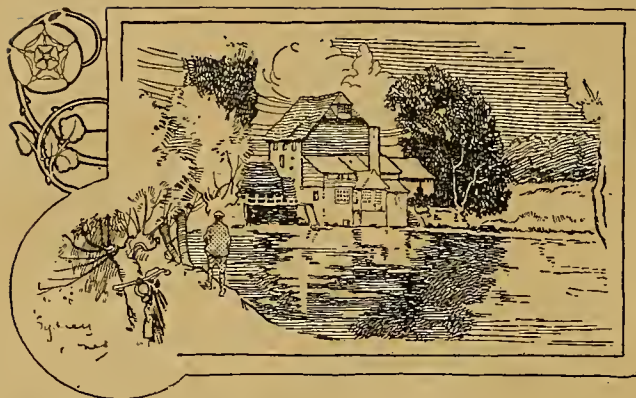
	m.p.g.
1. 3½ h.p. twin James ... ..	334
2. 3½ h.p. twin James ... ..	320
3. 3½ h.p. Rudge ... ..	187
4. 3½ h.p. Ixion ... ..	110
5. 2½ h.p. N.V. ... ..	192
6. 2½ h.p. Levis ... ..	192
7. 2½ h.p. Levis ... ..	160

These machines were, of course, tuned to give abnormally low consumption, but, with ordinary touring machines, we have ourselves obtained:

	m.p.g.
2½ h.p. two-stroke ... ..	180
3½ h.p. sidecar ... ..	100.1
5 h.p. sidecar ... ..	89

—[En.]





## THE MOTOR CYCLE AN AID TO THE "MOSS" GATHERER.

How it played a Useful Part in a Recently Organised Moss Day.

**S**PHAGNUM Moss, the origin and uses of which must be well known, is at the present time of very great value and in great demand. It is unfortunate in a sense that the latter statement should be the case, but the fact remains that large quantities are required daily for use in surgical dressings in the numerous hospitals both at home and abroad. The collecting of Sphagnum moss has been almost wholly left to the efforts of patriotic people all over the country. In the Shetland Islands the call for the moss has been most enthusiastically taken up, and at the suggestion of a member of the county council a special day was proposed to be set apart as a holiday when everybody who could be spared was to spend the day gathering moss. This was unanimously agreed to, and the 9th of August will be long remembered as an enjoyable holiday, fully vindicated as it was in a labour of usefulness. The result was gratifying to all concerned, as the day's "bag" was considerably over 2,000 bags, the success of the day's work being in no small measure due to the kindness of motor cycle and car owners in transporting the people to the hills free of charge to collect the spoils.

To those readers with a little petrol and time to spare, and having no desire or inclination to waste either,

also having no definite plan in mind of how to use the one or the other, the writer suggests that their time be put to the purpose of gathering Sphagnum moss.

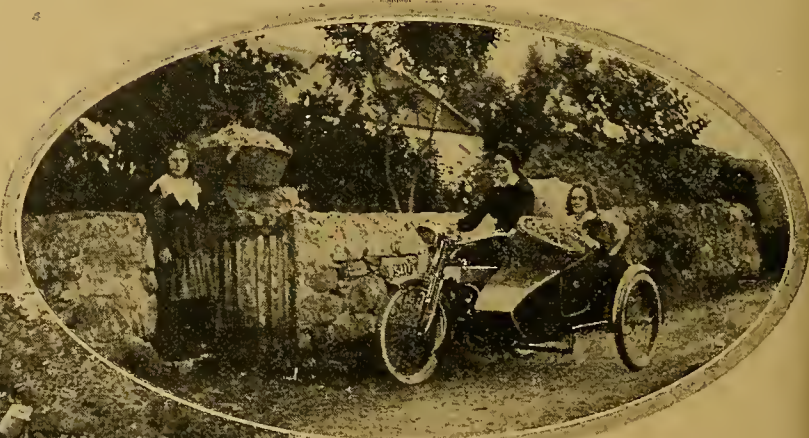
### Approach the "Mandarins."

Not only would they be helping to succour the wounded, but it would also serve the purpose of an excellent holiday in the open country with the clear conscience that they would not be joy-riding.

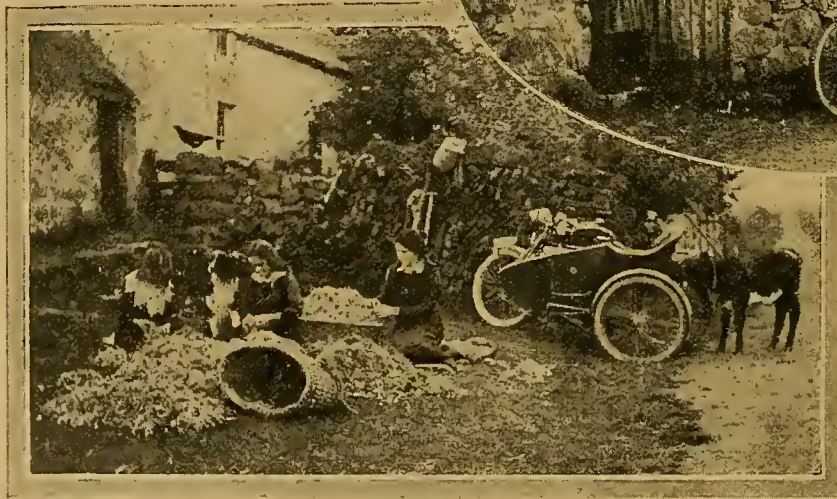
I would further suggest that for such a purpose the petrol "mandarins" could be approached to allow the purchase of the necessary spirit, but any concessions to motor cyclists appear to be very remote.

There are thousands of motor cycle outfits laid up temporarily through lack of petrol whose owners would be glad to haul them out again in order to take part in this good work.

ROBERT WILLIAMSON.



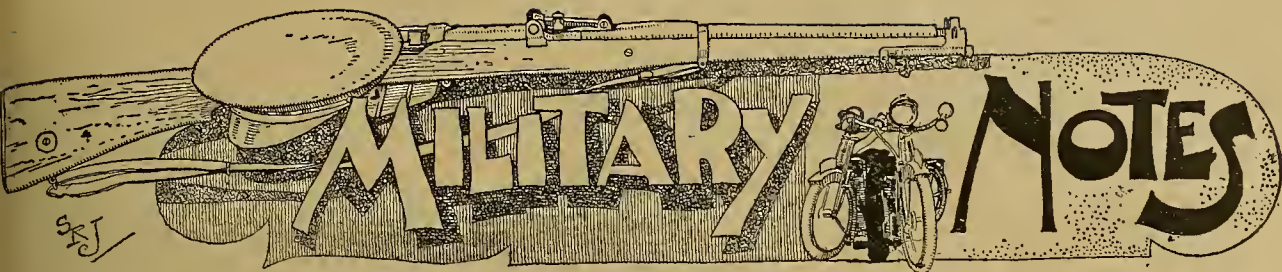
Arriving home with the results of a few hours' gathering of Sphagnum moss.



Sorting the moss whilst an inquisitive calf closely inspects the 1914 P. and M. outfit

[It is recorded that moss was used 400 years ago by the Highlanders after Flodden for the purpose of treating their wounded. Its modern introduction, however, we owe to Germany, who thirty years ago realised its valuable property of absorbing fluid.—Ed.]





## WITH THE FIRST TANKS IN FRANCE.

H. G. SAUNDERS writes us: "I am enclosing a photograph of four of the original Tank men, in the hope that it may be of interest. We are all old boys of the M.M.G.S., and came with the first lot of Tanks to France. We all went 'over' inside various Tanks, on that memorable day, September 15th, 1916, on the Somme, and have since seen service at Bapaume, Arras, and Ypres, and I am happy to say that up to the present we all remain unscathed."

"Reading from left to right the names are: Gunners Adams, Candlish, and Saunders; sitting, Gunner Bee."

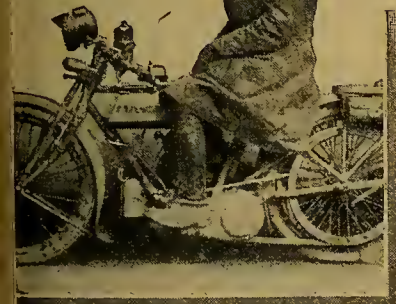
"Gunner Adams is the son of the motor cycle agent in Coventry, W. H. Adams and Sons, while I was formerly employed as a tester at the Sunbeam motor cycle works."

☞ ☞ ☞

## A P. AND M. EXPONENT.

W. PRATT will be remembered as a famous exponent of P. and M. motor cycles. He has been in the Army almost since the beginning of the war. He first of all joined the A.S.C., in which he stayed over two years, afterwards transferring to the M.G.C. He is a despatch rider, and is attached to the workshops of that corps.

W. Pratt, M.G.C., formerly a P. and M. expert, now a despatch rider.



## FLIGHT-LT. C. E. HOLAWAY KILLED.

WE regret to have to record the death of Flight-Lieutenant Charles Edmund Holaway, R.F.C., who was recently killed in action, whilst over the German lines taking photographs. Both he and his observer were killed.

It will be remembered that he was the inventor of the Edmund spring frame motor cycle. He joined up immediately



Flight-Lt. C. E. Holaway, killed whilst flying over the German lines

on the outbreak of war, and previous to taking his wings held a commission in the Cheshire Yeomanry. He took his theoretical course in Reading and his practical course in Egypt.

☞ ☞ ☞

## SAFE (?) JOBS.

THERE have been many comments on what is termed the "safety" of the work of the various units. Both the A.S.C. and the D.R.'s also have from time to time been singled out for criticism. The following letter received from Sgt. A. W. Bird, we think, vindicates the slurs occasionally cast on the A.S.C., M.T., whose work it is to keep the guns supplied with shells and the infantry with their bread and water:

"I read a short paragraph in your issue of *The Motor Cycle* August 9th referring to the A.S.C. as being a safe job, and I see a Mr. Frank Turner Denton has spoken up for us (the A.S.C., M.T.). Most people at home think we have got the softest job in the Army, and if you will insert these few words respecting the brave boys in the A.S.C. (both horse and motor) you will probably make it clear to some of these people, who have not even had the heart to go in for the 'soft' jobs, that there are not any soft jobs when near the firing line."

"I have been going with ten or fifteen lorries through

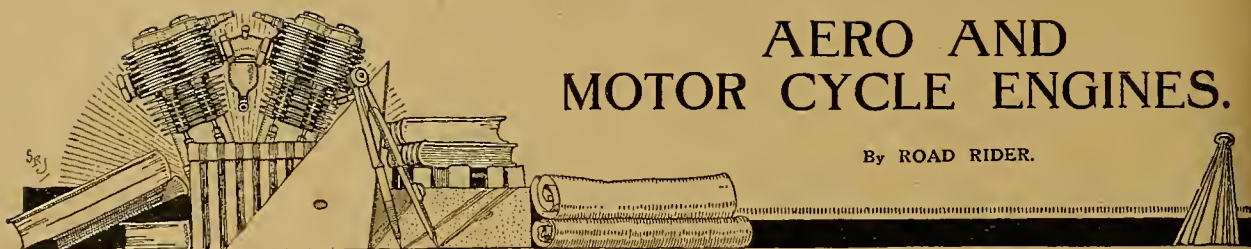
Ypres every night for the last few months, delivering shells to a heavy battery, and usually coming under shell fire about 10 p.m. At this point started the 'safe' job—men, mules, motor waggons, limbers strewn all over the road, teams of riderless horses racing along the road. Sometimes the motor driver runs into a dead horse harnessed to a broken waggon, and the obstruction he has to move before he can pass, and under shell fire and gas shells at that. When we get to the battery, wet or fine, the waggons may slip into a ditch or shell hole, blocking the road for all traffic for a time. I was in one of these blocks myself three weeks ago with eight lorries, when Fritz started shelling. One shell dropped between two of the waggons, blowing up two of the men and killing them; it blew up two horses near by, killing them and the driver. The same shell also blew two other of the men and myself into the air, landing us down a bank into a field, all three of us being wounded. I am now in bed with an injured back, after having been gassed twice."

"My age is 32, married, and I have one child. I have been in the Army two years, and gave up my business—the Aero Sidecar Co.—to enlist."



A group of boys of the M.M.G.S. who went with the first "consignment" of Tanks to France. Reading from left to right: Gnrs. Adams, Candlish, and Saunders. Sitting: Gnr. Bee.





# AERO AND MOTOR CYCLE ENGINES.

By ROAD RIDER.

## No. I.—AN ANALYSIS OF THE VARIOUS TYPES.

**N**OBODY has yet endeavoured to publish an estimate on how the aero engines, developed so marvellously during the war, will afterwards react upon road motors, and the following notes are a provisional venture in that direction. The finer points can best be brought out by contrasting motor car and aero engines, from which contrast conclusions affecting motor cycle engines can easily be drawn. The aero engine is not, as many folk imagine, a car engine enlarged in size and gingered up. It is a totally different proposition. A car engine may be designed to run up to 3,000 r.p.m., or even more. An aero engine's speed is limited by at least two obvious facts: (1.) There is a limit to the speed at which a propeller can be run without its glued-up bits of wood bending or flying asunder. (2.) If we could construct propellers which could stand colossal rates of revolution they would slip in the air as helplessly as a wet belt slips on a wet steel pulley. Thus, the aero engine is at present essentially a slow speed engine, and as it has no gear box to back it up, and must yet climb terrifically steep gradients at a frightful speed, and attain still more lurid speeds on the level, *i.e.*, in horizontal flight, it must also be a very powerful engine. So it is a slow speed engine, developing a terrific power thrust from each revolution. The motor car engine tends to become a high speed engine, developing quite an infinitesimal horse-power per revolution. To put the contrast vividly, some aero engines develop 1 h.p. per ten revolutions, whereas even racing cars in 1914 did not necessarily develop more than 1 h.p. per twenty, thirty, and even forty revolutions.

### The Weight Horse-power Ratio.

Secondly, the aero engine must be as light as possible. If I could produce a sound aero engine tomorrow which weighed just a quarter of a pound less per horse-power than existing types all the Governments in Europe would be sitting on my doorstep. Less weight means greater speed and a higher "ceiling" for fighting aeroplanes, more bombs or more ammunition for the giant aeroplane, or alternatively the power to carry more petrol, and strike deeper into the enemy's country. Even in peace this factor must always apply. The lighter the engine of the commercial aeroplane of the future the more mails or passengers it can carry, and the greater its earning power. An addition or reduction of 5 lb. per h.p. is a matter of small moment where motor car engines are concerned.

Thirdly, an aero engine must be thoroughly cooled. Except when diving, it is almost permanently working at its full power output, or very nearly so. On the

ground we can make shift with half-cooled engines, which overheat after quite a short dose of full throttle. In the air we must be able to run on full throttle for hours together. Super-cooling is therefore essential.

Fourthly, an aero engine may be noisy—I might say, must be noisy. In the present phase of aeronautics we cannot afford the weight, the wind resistance, or the back pressure which the exhaust-silencing system requisite for engines ranging from 100 h.p. to 475 h.p. would involve. We cannot detune an aero engine for the sake of pretty-pretties. So we see the exhaust merely conveyed clear of the pilot and any inflammable parts of the chassis by stream-lined funnels of wide bore, and we get up to seventy-two valves per engine, all clacking away maddeningly on a tappet clearance of several millimetres. *Per contra*, the exhaust of a motor car engine must be reduced to something approaching a subdued hiss, and overhead valves are almost unknown on cars, because of the difficulty of keeping them quiet.

### The Essentials of an Aero Engine.

These four points must now be tabulated for analysis in connection with their motor cycling inferences. An aero engine, we have shown, must be in the present stage of development:

1. A slow-speed high-power engine.
2. Pared down in weight to the last ounce.
3. Thoroughly cooled.
4. Very noisy.

None of these points is of very keen interest to the designer of a motor car engine, but all of them have a far closer relation to motor cycle power units. Consider them separately.

At present the tendency is to make motor cycle engines of the high speed type. One result of this tendency is that we are now saddled with very heavy and expensive gear boxes, seeing that our high-speed engines will not climb hills on anything approaching a touring gear. Given a good slow-speed engine, we might ultimately dispense with three and four-speed gear boxes in favour of a cheap, simple, and compact emergency gear; if the new type of engine weighed less than the old, as must happen in any case, we should either reduce the gross weight, or get such extras as spring frames and lighting dynamos thrown in without further undesirable weight increases.

A certain firm used to advertise, "If you see a 3½ climbing like a 6, it is an X——." Fining down the weight of cars is not of great import, it merely reduces the fuel and tyre bill fractionally. But if car owners had to push their cars out into the road before every drive, and if they had to pull them backwards on to



**Aero and Motor Cycle Engines.—**

four legs every time they left the car, we should hear a great deal about weight reduction. The Douglas firm based their prosperity on the fact that their original  $2\frac{3}{4}$  h.p. gave very nearly the same road performances as the  $3\frac{1}{2}$  h.p. types then current, as about 60% of the weight. A 40% reduction in motor cycle weights is certainly a technical possibility of the application of aero engine principles to the motor cycle, and if any firm should produce a machine which approximates to the baby two-stroke in weight and handiness, whilst equalling the road performances of a 4 h.p., the 4 h.p. type would rapidly become moribund.

The last point—noise—will hamper the translation of aero engine advances into terms of motor car practice but it will be far less felt in the motor cycling

sphere. Very few of us really object to noise, and many of us feel unhappy unless we leave a crackly exhaust astern.

It is thus pretty clear that the affinities of the aero engine with the motor cycling engine are much closer than with the car engine, and our particular branch of road motoring may be the first to profit from what aviation has taught us during the war. In a second article I will tackle other points more in detail.

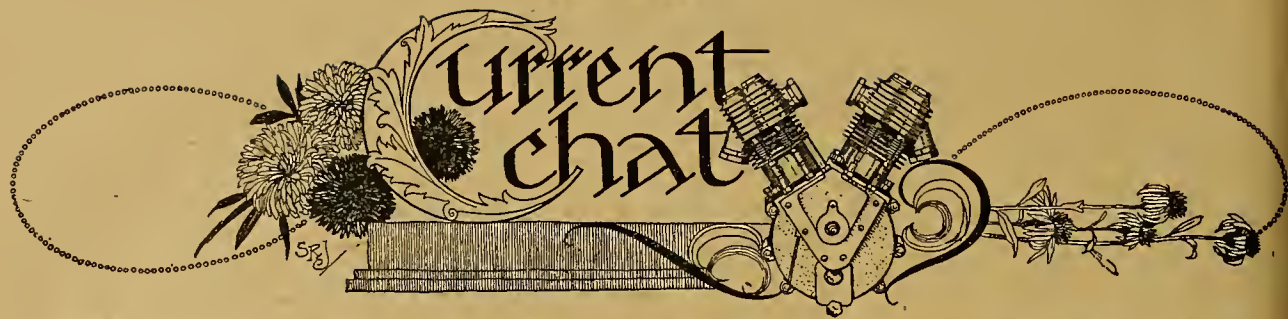
**CONTROL OF CRUDE OILS.**

According to the new Order made by the Minister of Munitions recently, no person will be able, after October 1st, to supply to any person, or take, or accept, or attempt to obtain delivery of any crude benzole, crude naphtha, or light oils containing benzole or toluol, except under licence.

**IN A HOT CORNER.**

The boys of the A.S.C., M.T., on active service get into many hot corners, and the incident we illustrate is a typical one. It occurred during the Somme offensive. Two batteries of "heavies" were in urgent need of shells, and supplies had to be sent up during daylight—most of such supply work is done under cover of darkness. The work of unloading was proceeding merrily when a taube, hovering around, spotted the convoy and directed fire. Soon shells were dropping unpleasantly close, and each lorry beat a hurried retreat "at its earliest convenience." The last two or three to leave were hit, and the last lorry was on fire when it got clear. What happened to it and its crew did not transpire, but the fact remains that "the goods were delivered," despite the attentions of Fritz. We should imagine that such an incident would give away the positions of the batteries, but we are not told whether it necessitated their removal. This, a genuine incident, was witnessed by a despatch rider, a former member of *The Motor Cycle* staff, from whose rough sketches and notes the drawing has been made. (Passed for publication by Press Bureau.)





### TIMES TO LIGHT LAMPS.

GREENWICH TIME.			
Sept. 27th	...	...	6.18 p.m.
" 29th	...	...	6.14 "
Oct. 1st	...	...	6.9 "
" 3rd	...	...	6.4 "

### Petrol or Substitute.

The enquiry of the garage proprietor who to-day asks you—"Petrol, sir, or substitute?" is on a par with the boarding-house enquiry—"Will you have cream, sir, or custard?" Who wants substitute if the genuine article can be had?

### Motor Cycles in the German Army.

The German military authorities, according to a German technical journal, possessed at the outbreak of war no fewer than 20,335 motor cycles. This is, of course, somewhat astounding to us, as before the war the motor cycle was but poorly developed in the land of the Hun. There was practically only one well-known make, and the Hun did not take kindly to this means of locomotion.

### An American Reliability Trial.

The Seattle-North Yakima-Goldendale-White-Salmon-Portland course again proved to be the hardest reliability course in the United States, as only two of the twenty-one starters in the Seattle M.C. trial reached the conclusion of the six-hundred miles run with full marks. The winning machines were a Thor and an Excelsior. One Harley-Davidson sidecar outfit accomplished the course in a remarkably consistent manner.

### Motor Cycling Engineers' Licences Suspended.

Considerable dissatisfaction has been caused amongst motor cycling engineers at Woolwich and Crayford owing to the action of the Petrol Committee in refusing to allot any further renewal of the meagre petrol allowance.

Many who live at districts some distance away, and inaccessible by rail or car, use their machines for travelling to and from work.

Owing to the action of the Committee a considerable number have already been obliged to lay up their machines, and many hours extra are now spent on rail, tram, and foot journeys.

### Woolwich Club Captain's Statement.

Interviewed by a correspondent, Capt. T. J. Ross, of the Lee Triumph agency, states that he has plenty of petrol, but he cannot supply enough for starting up. Many of his customers are munition workers using paraffin. "They have no licence, and I am not allowed to supply even half a pint," he states.

### A "Single" as a Pipe Cleaner.

Recently we saw a rider start up his engine, open the compression tap, and utilise the pressure to blow out his pipe. We were informed that the pipe "did not taste" after such treatment, but a whiff of the tobacco this worthy smoked fully explained the reason why.

### Army Sidecar Drivers.

A correspondent, seeing that the Woman's Legion, Devonshire House, Piccadilly, London, W.1, appoints lady sidecar drivers to the Royal Flying Corps, enquires if a similar corps could not be formed for youths between the ages of sixteen and eighteen years. He points out that this would be excellent training for young men who wish to go into the technical branches of the Army as despatch riders for the Royal Engineers and Royal Flying Corps, or for men intending to enter the Army Service Corps. He states that he is sure that if such a corps were formed it would be extremely popular and quite beneficial to the Army. We have pleasure in giving prominence to this suggestion.

### SPECIAL FEATURES.

#### OVERSEAS NOTES AND COMMENTS. A COMMERCIAL TRAVELLER'S CYCLE CAR A RUN TO BEER.

### The Motor Cycle Machine Gun.

In an official war film depicting the fighting at the battle of Arras, which has been the chief attraction at a New York theatre for some time, a motor cycle despatch rider hurries along a shell-torn road, and carries to the M.G.C. rest station the news that additional machine guns are needed to strengthen the thinning Allied line. In a few seconds the machine gun combinations are manned and are heading for the firing line.

An American journal says: "The precision and daring with which the grim task is undertaken speak volumes for the efficiency of the motor cycle units now operating with the Allied armies, and prove that the two-wheeler, so generally regarded in this country as a recreation vehicle, has met satisfactorily the stern demands and ever-shifting requirements of the world struggle."



### NOT A PETROL COUPON.

After October 1st no petrol will be obtainable except by coupons. It would be a daring prophecy to forecast the time when a motor cyclist will be able to purchase without restriction a sidecar load of precious fuel such as is shown above.



**The National War Funds.**

At the week-end the principal war relief funds stood as follow:

The National Relief Fund (distributed £3,657,622) ..	£6,230,855	0	0
British Red Cross Fund ..	7,305,338	0	0
Tobacco Fund ..	137,225	0	0
Queen's Work for Women Fund	173,235	14	9

**A Remarkable Flight.**

On Monday, Capt. Lanreati, of the Italian Air Service, accompanied by Air-mechanic Michael Angelo Tonzo, flew from Turin to London, covering a distance of 656 miles in 7h. 22m. 30s., the average speed being 89 m.p.h. He crossed the Alps at an altitude of nearly 12,000ft. *via* Mount Cenis, and for the most part followed the line of the railway. The passage of the Channel occupied 15 min. Capt. Laureati brought with him an autograph letter from the King of Italy to King George and several of the Italian morning papers, which thus arrived in London by tea-time. This airman had already made a non-stop flight from Turin to Naples and back (920 miles).

**Limitation of Acetylene.**

The Ministry of Munitions takes possession from the 24th September of all calcium carbide in the United Kingdom, except the stocks of persons who do not own more than half a hundredweight. Any person who, having control of any calcium carbide exceeding half a hundredweight without the consent of the Ministry of Munitions, sells, removes, or secretes or deals with it in any way contrary to any conditions imposed in any permit he may have been granted in respect thereof, will be guilty of an offence under the Defence of the Realm Regulations. No person shall, until further notice, buy or sell carbide except under and in accordance with the terms of a permit issued under the authority of the Ministry of Munitions. The Ministry of Munitions also asks for monthly returns of all calcium carbide, except where stocks do not exceed half a hundredweight. All applications with reference to the Order should be made

to the Controller of Non-ferrous Material Supplies, Hotel Victoria, Northumberland Avenue, London, W.C.2.

**A Sporting Challenge.**

A well-known firm of manufacturers of 4 h.p. single-cylinder machines have issued a challenge to the Editor of *The Motor Cycle* to take on any 6 or 8 h.p. twin over a given route, terminating with a severe test hill. Both machines are to be fitted with sidecars, and the makers of the lower-powered machine are permitted to choose their route and to make their own conditions. We have accepted this sporting challenge.

**Average Prices.**

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3½ 2-speed .....	£40	£40
Abingdon ..	1914	5-6 3-sp. sidecar ..	£54	£54
A.J.S. ....	1916	6 combination ..	£101	£92
" .....	1914	6 combination ..	£69	£68
" .....	1916	4 combination ..	£75	£75
Allon .....	1916	2½ 2-speed .....	£34	£30
" .....	1914	2½ 2-speed .....	£27	£27
Ariel .....	1915	3½ 3-speed .....	£72	£73
" .....	1914	5-6 combination ..	£53	£53
Bat .....	1914	6 3-speed .....	£45	£45
Bradbury ..	1914	4 2-sp. sidecar ..	£40	£40
Brough ....	1916	3½ 2-speed .....	£62	£55
B.S.A. ....	1916	4½ sidecar .....	£65	£66
" .....	1915	4½ sidecar .....	£58	£57
Calthorpe ..	1916	2½ 2-speed .....	£30	£30
" .....	1915	2½ 2-speed .....	£28	£26
" .....	1916	2½ 2-stroke .....	£28	£28

Make.	Year.	H.P.	Average last week.	Previous weekly average.
Clyno .....	1915	2½ 2-stroke .....	—	£25
" .....	1914	6 combination ..	—	£65
Connaught ..	1915	2½ 2-stroke .....	£20	£25
Douglas .....	1916	2½ 2-speed .....	—	£47
" .....	1915	2½ 2-speed .....	£42	£43
" .....	1914	2½ 2-speed .....	£32	£38
Enfield .....	1916	6 combination ..	£84	£84
" .....	1915	6 combination ..	£78	£70
" .....	1916	3 2-speed .....	—	£45
H.-Davidson ..	1916	7 combination ..	£85	£84
" .....	1915	7 combination ..	£72	£65
Henderson ..	1916	10 combination ..	—	£100
" .....	1915	10 combination ..	£75	£76
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	5 combination ..	£70	£70
" .....	1916	7-9 combination ..	£83	£82
" .....	1915	7-9 combination ..	—	£64
James .....	1916	4½ combination ..	—	£67
" .....	1916	2-speed, 2-stroke ..	—	£33
Lea Francis ..	1916	3½ 3-sp. sidecar ..	—	£63
" .....	1915	3½ 3-sp. sidecar ..	£68	£55
Levis .....	1916	2½ Popular .....	£21	£24
" .....	1915	2½ Popular .....	£30	£22
Matchless ..	1915	7 combination ..	£85	£81
New Hudson ..	1916	2-sp. 2-stroke ..	—	£28
" .....	1916	4 combination ..	—	£60
New Imperial ..	1916	2½ 2-speed .....	—	£34
" .....	1915	2½ 2-speed .....	—	£28
Norton .....	1916	3½ 2-speed .....	£57	£52
" .....	1915	3½ T.T. ....	—	£43
P. & M. ....	1915	3½ combination ..	—	£69
" .....	1914	3½ combination ..	—	£50
Premier .....	1914	3½ 3-speed .....	£40	£51
Rover .....	1916	3½ 3-speed .....	£60	£55
Royal Ruby ..	1916	2½ 2-stroke .....	£20	£24
Rudge .....	1916	3½ Multi .....	—	£44
" .....	1915	3½ Multi .....	£45	£40
Scott .....	1916	3½ combination ..	£70	£60
San .....	1915	2½ 2-speed .....	—	£22
Sunbeam .....	1916	8 combination ..	—	£101
" .....	1916	3½ solo .....	£76	£73
" .....	1915	3½ combination ..	—	£76
Triumph .....	1916	2-sp. 2-stroke ..	—	£37
" .....	1915	4 countershaft ..	—	£55
" .....	1915	2-sp. 2-stroke ..	—	£28
Velocette ..	1915	2½ 2-sp. 2-stroke ..	—	£27
Zenith .....	1915	8 Gradua .....	—	£60



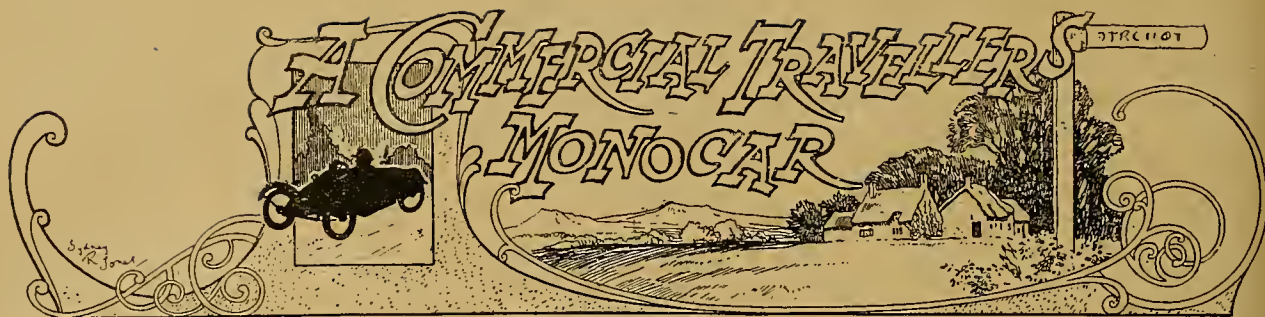
**INSPECTION OF EAST YORKSHIRE  
MOTOR VOLUNTEERS.**

(See page 308.)

(1) Lord Nunburnholme and the Adjutant, Lt. Lockey, inspecting the motor cyclists of No. 3 Section.

(2) During the inspection. The figure on the left is Sgt.-Maj. Kilby, to whose energies the smartness of the men is largely due.





## A HANDY FOUR-WHEELER FOR THE BUSINESS MAN.

**T**HE possible future of the monocar has previously been referred to in these pages, and, whilst admitting that such a vehicle has a promising future, the writer is of opinion that, with the solitary exception of the sporting rider in search of a new sensation, its market will be limited almost entirely to one special class of buyer, viz., the commercial traveller, particularly the one with a scattered rural district to cover, and who does not carry any great weight or bulk of samples.

A train is inconvenient and expensive, in some cases even impossible, owing to waste of time and delays waiting for trains on badly-served local and branch lines.

A light car costs at least 3d. per mile to run, and its depreciation and upkeep put it beyond the reach of most men unless doing big business.

The motor cycle is the only alternative, and after four years' continuous all-weather riding in nearly every county in England and Wales, the writer has been reluctantly compelled to give it up, chiefly owing to lack of protection in any but the best weather.

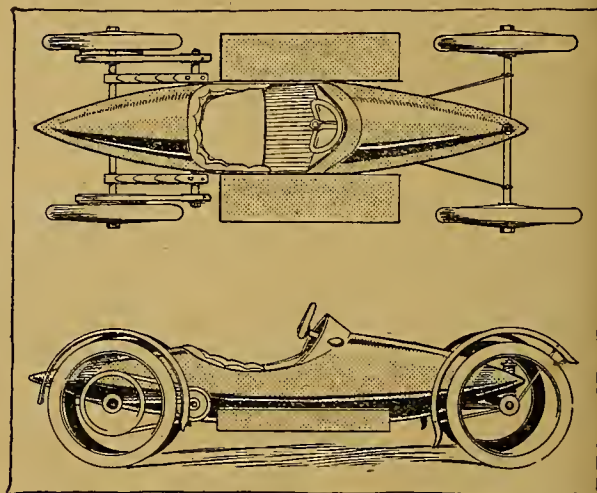
Various mudshields have been placed on the market, but if efficient they are usually unsightly. In any case one is compelled to don overalls, and the appearance of a rider after a heavy day's round under winter conditions is not by any means prepossessing. Of course, one can get out of one's overalls in each town or village, but this is a messy operation: boots require cleaning, time is wasted, and clothes cannot be expected to retain their shape and appearance under constant treatment of this kind. Whatever enthusiasts may urge to the contrary, appearance counts for a lot when making calls, particularly on "new ground," and no man either looks or feels his best when dirty or muddy and dressed in the usually hideous overalls. Customers do not like a representative on their premises dripping pools of water and liquid mud all over the place, as has been the writer's painful lot on many occasions.

### Possibilities of the Four-wheeled Solo Mount.

Another grave objection to the motor cycle is the difficulty in cleaning it, even after a short ride on muddy roads. Even the best machines seem to have innumerable holes and corners in which mud can collect, and thorough cleaning is a two or three hours' job, as many riders who take a pride in their machines know to their cost. Few business men, therefore, have time to keep their mounts in that condition which will assure a good price when it comes to selling at the end of two or three years.

The conclusions arrived at, and the possible market for a traveller's monocar specially designed to overcome the foregoing objections, induced the writer to design the machine shown in the sketches.

Neither speed nor sporting appearance was the deciding factor in the shape of the body, but simply reduced wind resistance, ensuring economical running, and the elimination of every possible hole or corner where mud could collect. By putting a tight-fitting waterproof sheet over the seat "well," a hose could be turned on and the whole vehicle cleaned in a few minutes.



A suggested design for a light four-wheel monocar, suitable for commercial travellers. Detachable flat lockers for clothing or samples take the place of an ordinary running board.

The specification is briefly as follows:

**Frame.**—Two curved side members of well-seasoned ash, to which springs, engine, countershaft, and tank are secured. The body is simply a light shell on aero-plane lines, composed of thin wood strips, covered with waterproof canvas, painted and varnished. Sheet aluminium could also, of course, be used, but would cost much more.

**Engine.**—Although not definitely decided upon, a horizontally-opposed two or four-stroke engine, about 72 mm. bore x 63 mm. stroke, would be fitted, air-cooled by blower fans as shown. Lubrication for the two-stroke on the petrol system.

**Gear.**—Two speeds, constant mesh and dog clutch type, fixed on countershaft; clutch expanding ring on P. and M. lines.



**A Commercial Traveller's Monocar.—**

*Mudguards.*—Fixed to axles, well stayed to prevent wobble; and light, but of good width.

*Wheels.*—26in. × 2¼in., all detachable and interchangeable.

*Engine Starter.*—By handle and steel cable projecting through dashboard.

*Fittings.*—Footboard metal, hollow, and fitted with by-pass from exhaust, to heat inside of body in cold weather. The convenience of this fitting on cold, raw winter days can readily be appreciated. Carburetter tickler also operated from dashboard.

If desired, the running boards could be made in the form of long shallow boxes, and without detracting from the appearance could be designed to hold quite a lot of small samples, clothing, etc.

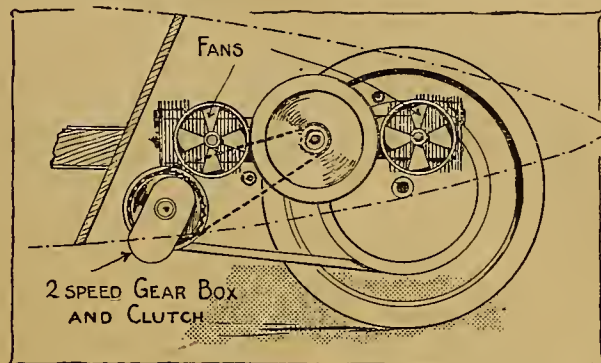
Some objection may be taken to the belt drive, but as there would be two belts, and the small pulleys are 7in. diameter, slip would be practically impossible.

The narrow track of the vehicle should make it particularly handy in country lanes, and as everything is completely cased in, it could even be left in any convenient yard overnight and would take little room.

In the course of his travels the writer sounded the opinions of a large number of commercial travellers

as to the probable reception of such a vehicle, and the impression gained was decidedly encouraging.

It is hoped to introduce this vehicle to the market after the war at a very attractive price. A standard A.B.C. 3½ h.p. engine may be used, or, on the score of simplicity, an engine on the lines of the two-stroke H.O. Levis. MONO.



Position of gear box and fan wheels, the latter being rubber faced and driven by flywheel.

## OVERSEAS TRANSMISSION.

**A Chain Case designed to give Partial Protection combined with Accessibility.**

**T**HE exposed position of the average lightly-constructed enclosed chain case is the cause of considerable trouble in machines used for rough "cross-country" work, and it is doubtful whether the present forms will survive in the standardised Overseas machine.

It is probable that machines used on pioneer farm work would be subjected to a great deal of unsympathetic handling, quite apart from the severity of the riding conditions; for instance, it might often be necessary to transport or store them amongst a diversity of agricultural implements or merchandise in whatever primitive manner chanced to be available, and under such circumstances flimsy sheet metal cases are apt to become dented, so that the limited internal clearances no longer permit the chains to run without scraping, whilst the difficulty of reuniting the various parts of some cases, after they have once been badly buckled, is enough to make the angels weep.

The cast aluminium case has decided advantages in respect of accessibility and ability to withstand a good deal of rough usage, but its brittleness and difficulty of repair in the event of breakage render it somewhat unsuitable for deeply-rutted or boulder-strewn country.

Total enclosure of the working parts is not one of the essential ideals of the practical rough service machine, for, if tolerable protection from the elements

can be secured, it is preferable to leave the transmission exposed to the rider's view.

**A Happy Medium.**

The high-speed chain from engine to gear box might well be encased in a cast aluminium cover, such as that of the W.D. Triumph, leaving the rear chain to be amply protected by something forming a happy medium between the totally enclosed case and the small guard over the top run of the chain.

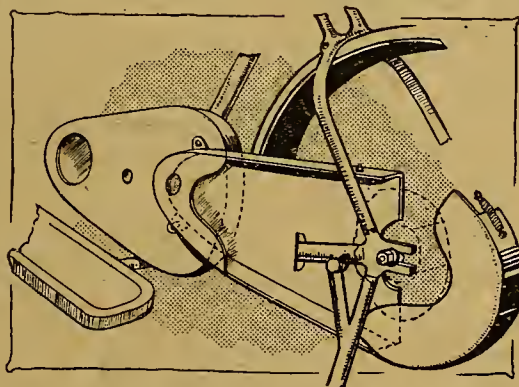
The writer's suggestion is, in effect, that a full chain case less the front or outward portion be used. Such a fitting made in sheet aluminium would be readily straightened if accidentally damaged, it would afford the maximum protection short of completely enclosing the chain, and would not emit the same annoying rattles as the sheet steel case.

The cheapness of manufacture is self-evident, and

has possibly a large bearing on all questions affecting Overseas machines, which will have to compete in a market already being catered for by a highly organised quantitative production.

A sketch of the suggested design is shown applied to a standard chain-driven machine. The hinged rear portion allows of easy access to the wheel, and is retained in position by a spring catch similar to those used to hold down the bonnet of a car.

W.HARFEDALE.



A semi-enclosed chain case as suggested by "Wharfedale" for Overseas motor cycles.



# EAST YORKSHIRE MOTOR VOLUNTEERS.

## First Parade and Inspection.

ON Sunday the East Yorks Motor Volunteers had their first parade *en masse*, when they were inspected by Lord Nunburnholme (Lord Lieutenant of the East Riding) and Brigadier-General Lord Basing, inspecting officer of the Northern Command for the Volunteer Forces. The inspection took place on the Hull Fair Ground, and was witnessed by a large crowd. In addition to the numerous cars there were a number of motor cyclists, who are attached to each of the four sections, and the men looked very smart in their uniforms, which bear the A.S.C. badge. After the inspection the inspecting

officers complimented the men on their smart appearance and said they would undoubtedly prove most useful in the event of the country being invaded. He also complimented the C.O., Major A. J. Atkinson, in raising such a large body of men in such a short time as the corps has been in existence. The men, who are stationed at Wenlock Barracks, Anlaby Road, have now acquired a most comfortable club, which was opened last week, and the weekly drills on Thursday evenings are well attended. It may be mentioned that more motor cyclist recruits can be enrolled at the barracks any drill night.

## ALCOHOL AS A MOTOR FUEL.

### Investigations that have taken place in Australia.

THE possibilities of the use of alcohol as a fuel for internal combustion engines have become of the utmost importance in view of the scarcity and high price of petrol. Motor cyclists will, therefore, learn with interest that a special committee has been appointed by the Commonwealth Advisory Council of Science and Industry to enquire into the production of industrial alcohol in Australia and the design and manufacture of engines suitable for the use of this fuel.

Seven meetings of this committee were held during April, May, and June, and much valuable information was obtained from all quarters. The committee also got into touch with experts and scientific bodies, including the Alcohol Motor Fuel Committee of the Imperial Motor Transport Council. The main aspects are classified as follows:

- (1.) The design and manufacture of the engine.
- (2.) The supply and distribution of alcohol.
- (3.) The denaturation of the alcohol.

These aspects will be investigated concurrently, for makers will not produce engines unless a supply of alcohol is forthcoming, nor would the spirit be serviceable without the engines. When alcohol is used in petrol engines the fuel consumption is high, but this can be improved by increasing the compression and heating the carburetter. The second difficulty is that of starting from cold; in motor cycle practice this would best be overcome by using a small amount of petrol for starting purposes, and afterwards heating the carburetter by one of the many methods in use.

### The Advantages of Alcohol.

The committee consider that alcohol has many advantages when compared with petrol, so that the difference is not entirely on the debit side. The high compression which can be used increases the thermal efficiency of the engine and the fuel is unusually homogeneous, while the products of combustion are almost odourless and free from smoke.

Large quantities of alcohol can be produced in Australia, the most economical source at present being sugar molasses, which should yield about 4,000,000 gallons annually. Other sources are maize, wheat, barley, potatoes, and beet.

As has already been stated, alcohol can be mixed with benzole and used successfully in present-day engines. A correspondent, whose letter we print on another page, tells us that he used it mixed with petrol in the proportion of 4 to 1, but he gets less power than with petrol alone, and the engine runs hotter.

### Denaturing the Fuel.

The question of denaturing the spirit seems likely to meet with the same difficulties with the Customs authorities as would be the case in England, and the committee would be glad of expert advice respecting a cheap and suitable denaturant. Any communications may be addressed to the Secretary of the Alcohol Motor Fuel Committee of the Imperial Motor Transport Council, 39, St. James's Street, London, S.W.1. Those of our readers who desire more information on this interesting subject are referred to *The Autocar* of this week, which will contain a much fuller report.



### HOW HAPPY COULD HE BE WITH EITHER.

After using powerful W.D. mounts no doubt the D.R. would not hesitate long in deciding which "fair charmer" he wished away.



# A RUN TO BEER.

AN ARTICLE WHICH WILL  
NOT APPEAL TO THE  
SPEED MERCHANT.



Mr. and Mrs. W. C. Jacob and the  $3\frac{1}{2}$  h.p. Humber on which the jaunt was taken.

**W**HEN the holiday question on the domestic agenda came up for discussion we looked at the map (as per the excellent advice of Bethmann-Hollweg), we looked at our petrol card, we looked at the old 'bus, and we looked at each other. We felt that we wanted a holiday. 'Melia had been doing two days a week voluntary work with the local War Workers' Depot in addition to her usual household duties, and I was feeling that the office boy, the order clerk, the repair shop foreman, the London representative, and the departmental manager—in brief, Myself—needed a change from the rôle of Pooh-bah (without the salaries). We had two tangible gallons of petrol in hand and six hypothetical gallons still on the card granted by a beneficent Control Board last August. We had paid our tax and taken out our driving licences, so we decided to brave the fierce wrath of Mr. Cathcart Wason, *et hoc genus omne*, and allow one Army lorry to go dirty for a few days while we used its customary shampoo lotion for a jôy ride.

The selection of our destination was easy. It was really Hobson's choice. We wanted to get to the seaside as far from London as possible, we wanted to have a full day's run—our maximum petrol supply was eight gallons; we only get forty miles to the gallon ("Kamerad! 'Ixion.' Kamerad!")—so that our limit was obviously about a hundred and fifty miles. Taking London as a centre, and describing a circle of the above radius, it will clearly be seen that our choice was limited to the happy hunting grounds of the late lamented Count Zeppelin, Cardiff, Minehead, or East Devon. We went to North Devon last year, Cardiff does not appeal to one as a holiday resort, and as a friend gave me a good address for diggings at Beer, near Seaton, we said, "The King asks us not to drink beer, but he said nothing about swimming in Beer, walking in Beer, and living in Beer, so Beer it shall be."

## The Route Chosen.

I had been reading *The Motor Cycle* very carefully since the halfpenny dailies had faded into three pages

of eyewash and one page of quack medicines, and when I looked at the old 'bus with visions of post-war paragons floating through my mind my heart sank to

my pre-war boots. It is a  $3\frac{1}{2}$  h.p. air-cooled Humber, age five-six years, with Humber-Roc two-speed gear, B. and B. carburetter, with straight through vaporising jet, and  $\frac{7}{8}$ in. belt. The sidecar is a Swan, up the capacious back of which 'Melia stuffs so many things that a conjuror would have a spasm of jealousy if he saw her unpacking an apparently empty car. We had had many jolly jaunts round Surrey, but it seemed to be asking for trouble to attempt a run of a hundred and fifty miles in a day on a road bristling with r in 9 hills, like the coast road through Dorset. On the other hand, everyone warned us not to take the main road *viâ* Salisbury, as it was full of pot-holes and black with motor lorries, whose drivers are taught to ignore the humble motor cyclist and drive over him for preference. However, a line to the Editor brought the sound advice, "Go *viâ* Salisbury and Crewkerne," so we decided to be unconventional and adopt his suggestion.

Now it is a bad thing to have an obsession, whether it is about an important matter such as a belt or trifling things such as the date when the war will end or how many Russians came through London a couple of years or so ago. This particular obsession was about a belt. The 'bus is built for a seven-eighths belt (nice alliteration, that!); but it had an inch belt on it when I bought it, and I naturally followed precedent. But, after much trouble and profanity on that account I determined to try a seven-eighths. The cognoscenti wagged their heads and said I was flying in the face of Providence; but I held to the luck of the novice. Thereafter all went merry as a marriage bell. The belt (a Dunlop, with Dunlop fastener) ceased from troubling as if by magic; but as everyone had said, "Never mind, it will let you down some day," the seed of an obsession was sown in my mind.

## The Broad Highway.

The start of our holiday came at last, and dawned gloriously. We were up betimes, pumped up the tyres, filled the tanks, and got out the 'bus. Here I may say (as additional evidence that we are middle-aged and old-fashioned) that we follow the practice which the "blue cover" experts claim to be as extinct as the dodo. We detach the sidecar in order to get it through our side entrance, which it clears with about as much room as there is between a cork and the neck of a bottle. There was a good stiff breeze blowing from the south-west, and therefore dead against us; but we hobbled pleasantly along, climbed Coombe Hill on top, and threaded our way through Kingston, Hampton Court, Sunbury, Staines, Egham, and Virginia Water. Here we stopped to change over, for 'Melia prefers the saddle to the sidecar, and was not content until she had designed herself a charming divided skirt. So I smoked my pipe in peace and contentment in the roomy and comfortable Swan, and on we went happily through Bagshot and Hartford



### A Run to Beer.—

Bridge to Basingstoke, dodging a few Army lorries, but finding the road exceptionally good and clear. But somehow we seemed to be making bad time. The engine was revving merrily and devouring petrol at a gluttonous rate. Something seemed to be slipping, and I reflected gloomily upon all that had been said and read in disparagement of belts in general and the seven-eighths variety in particular. My feelings slowly sank to zero, especially as I had omitted to bring the

Saturday the boys were all streaming into Salisbury—walking, cycling, and in Fords crammed to bursting point. But they never gave a moment's trouble, and as all the danger points were clearly marked and military police on point duty, we made a clean run through. But, oh! the pace.

### Teatime and Fifty Miles to go.

When Shaftesbury was reached it was fully teatime. A busy town, innumerable speed limits, the wrestle with the belt, a couple of "konks" on steep hills, an adverse road, a fill-up, and two changes of drivers had brought our average down with a nasty jerk. Truly does "Ixion" say it is not only the riding time which determines the m.p.h.

At Shaftesbury we secured a good tea, crept cautiously down the awkward hill out of the town, and were just preparing for a long trek against time when we noticed that the front tyre was as flat as a flounder. We looked round the cover in vain for the common or garden hobnail, and changed the valve rubber to no purpose. When the cover was taken off we found that the extreme point of the butt-ended tube where it is pushed into the other end had gone for a little bust on its own account. By the time we had made a good job of the repair it was past seven o'clock, and fifty miles of difficult and unknown road still stretched between us and our haven. But we kept a stout heart. Melia climbed into the saddle, and with an open



The main street in Beer which leads straight to the sea.

small spare piece which had hitherto served as a mascot. "Now," I thought, "is the appointed day when we are going to be let down."

Near the fifty-mile limit we stopped by the wayside, and 'Melia spread an attractive meal after conjuring with the Swan. Refreshed thereby, and soothed by my trusty briar, I made a hasty diagnosis, decided that the belt was too slack, and tightened it by altering the variable pulley which raised the gear. The 'bus seemed to respond to this treatment, and we made better time through Andover to Salisbury. The road remained good and clear, and even the last five miles of this stretch, although gritty, were better than many a second-class Surrey road. But the slip made itself a nuisance again, so we pulled up, and I took a piece out of the belt.

On again through busy Salisbury, dodging fearsome engines marked "W.D. Roads," which vomited fire and smoke, and then out through Fovant. As it was



Beer from Beer Head.

throttle we made for Yeovil. Why do all machines, push and petrol, go better after tea? The rest seemed to have improved our running powers, and we made good time until an indistinct signpost pulled us up at the foot of a short one in nine. Crawling up this from a standing start we konked half-way up, the brakes refused to hold with the engine in free, the 'bus ran backwards, the sidecar wheel mounted the bank, and the next thing I realised was that the machine was on its side, the car in the air, and I was slowly describing a graceful parabola towards Mother earth.

We were up again in a minute with no more damage than a slight bruise and a bent air lever. After admiring the view I took the hill minus passenger, and then



**A Run to Beer.—**

away we went again through Sherborne, Yeovil, and Crewkerne, leaving the main road near Chard at Cricket St. Thomas. The main road had been uniformly good, but this road was narrow, tortuous, and uneven. The shadows were lengthening, and we had to keep a sharp look-out for errant cows. We had passed Tytherleigh and nearly reached Axminster when a limb of the law was raised before us, and we were reminded that it was past lighting-up time.

It was exasperating, as there was plenty of light, and every minute was of value to us, but we obeyed like good citizens. Quite fifteen minutes passed before the carbide decided to launch its gas attack, then away we pobbled furiously through Axminster, with the night growing ever blacker. Signposts seemed to have vanished, or were in obscure corners where the public cannot find them. At Axmouth a sharp turn to the left brought us alongside the river (which covers the road at high tide), and the prospect grew more eerie with every mile. A bridge loomed up whitely and we passed across it into Seaton. The place was dark and deserted, except for three Belgians (one in uniform) who gave us of their best in broken English. Away we sped up the wrong road, where we found three other men who redirected us in broad Devonshire. Both sets of guides left us hazy, but we landed the right road at last, and congratulated ourselves that we had only two miles to go. It took us nearly an hour to do those two miles!

Beer is separated from Seaton by a nice hefty cliff, to avoid which the road sweeps inland and then turns back upon itself, while there is another road for foot passengers only, which goes straight over the cliff. We pobbled along the main road for about a mile, climbing the hills on low gear, and seemed to be going farther from civilisation every minute. We turned and ran down again. Darkness surrounded us, and perfect solitude. We tried the other road, but the engine gave up the attempt almost at once, and we found next day it was a one in four! Back we came again, waited, argued, reasoned, and listened until we heard footsteps. An unsteady figure hove in sight, and had apparently achieved the impossible by getting tipsy on Government ale, and was evidently making for Beer

again. With a majestic sweep of the arm which neatly upset his equilibrium, he indicated our road, and we pobbled away up hill again. But two miles sped on, three miles, and still no sign of Beer. With our shaded lamps we could only see a few yards ahead; we could hardly tell if we were going up hill or down; our exhaust lifter seemed reduced to a jelly; our throttle controls had worked loose and slipped round the handle-bars; one front brake guide had slipped down the front fork; and we seemed to be going farther into desolation every moment. It was a nightmare we seemed to be riding, not our trusty old 'bus, and 'Melia had just made up her mind to curl herself up under a daisy and wait for dawn when a lighted window appeared.

**Beer at Last.**

The people at the cottage gave us intelligent directions for finding the turning we had missed in the darkness, and also told us exactly where to find the haven of rest for which we were bound, so that in five minutes more we had aroused our good hostess from her beauty sleep, and were apologising volubly, but quietly, for our tardy arrival. As all garages were shut and everyone in bed, apparently, we left the 'bus in a neighbour's front garden, and after the briefest of suppers "with a pleasure quite emphatic, we retired into our attic," murmuring softly "When you come to the end of a perfect day." We had been on the road nearly fifteen hours, an average of about ten miles an hour! I blush; but even an up-to-date heavy twin would have been as powerless on that last lap unless the driver had had cat's eyes.

How we awoke next morning to find the rain teeming down and remembered that our poor mount was in the open, how we found that our trunk had not arrived, how we tracked it to Barnstaple, but failed to recover it the whole fortnight (my benison on the man who invented double collars!), how the visitors next door cheered us during that first Sunday by singing doleful hymns, how we tramped about in borrowed plumage and watched the Beer folk fishing for bass—all these things are another story, as Kipling says, and not for these pages. There is a speedy touch about a happy holiday, and all too soon the day came for the return journey. A POBBLER OF FORTY-FIVE.



DOING THEIR BIT IN THE AMERICAN ARMY.

One of the many uses to which the sidecar is put in the military forces of the United States is that of convoy to the supply trains. The escort occupies the dog-tents in rear of the park of machines. The combinations shown are Indians.



# LETTERS to the EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hartford Street, Coventry, and must be accompanied by the writer's name and address.

## COOLING AND LUBRICATION.

Sir,—“Chinook's” article on “Cooling and Lubrication” is not very convincing to the average novice, amongst which class I rusticate. Firstly, “Chinook” says: “Cylinders are kept cool not by radiation, but by impingement of the air . . .”; and shortly afterwards instances cases of air cooling by radiation only, and also by radiation plus impingement. What does he really mean? His account of mountaineering in search of heat prompts the query, was the main road, when rejoined, higher, similar, or lower in altitude than when he left it? If higher, where was the need for the mountaineering “stunt”? If lower or similar, did “Chinook” still carry on “all out in low” down the inevitable declivity to retain the heat so laboriously generated?

If I read his writing and section of piston correctly, I should like to know from where he manages to get his vacuum in the crank case (at the bottom of the piston stroke) to induce the blast of cold air on to the piston cooling fins? I think he is more likely to get a deluge of oil spray on his overalls.

J.W.

Belfast.

## INDUSTRIAL ALCOHOL.

Sir,—It may perhaps be of some interest to the readers of your here most appreciated journal, *The Motor Cycle*, to know that it is now prohibited to use petrol or benzole as a fuel in Denmark, unless it has been mixed with industrial alcohol.

You write in your issue for August 16th, page 153, that “petrol and alcohol do not mix.” This is an error. They mix quite well, but *only* in the proportion you propose for benzole and alcohol: 80% alcohol (95% strength or even less) to 20% petrol. This mixture is sold here, but not for pleasure riding. My experience with this fuel on a Harley-Davidson is as follows:

1. Less power and flexibility.
2. Increased temperature.
3. Very increased consumption of both fuel and oil.

Will you at the same time permit me to ask if anyone has obtained a better result as to petrol consumption than sixty-two kilometres on one and a half kilogrammes of petrol, with sidecar, passenger, windscreen, and baggage, on a 1917 Harley-Davidson, electrically equipped? This, I think, is a rather uncommon performance.

I receive your paper quite regularly; not one number has been lost, in spite of warfare.

Copenhagen.

MAX LOBEDAUF, M.A. (D.R.)

## A POST-WAR IDEAL.

Sir,—I have followed with keen interest the correspondence in *The Motor Cycle* regarding post-war design, and am both surprised and disappointed that the Knight sleeve-valve engine has met with such scant notice. This is probably due to the fact that but few motor cyclists are familiar with this splendid motor, in which the only valves are two well-lubricated sleeves, operated by eccentrics, sliding silently up and down inside the cylinder, the old bouncing poppet valves, with clattering tappets, unreliable springs, air leaks, and ugly projecting pockets being eliminated.

Owing to the perfect symmetry of the Knight cylinder, the combustion chamber, by using a piston with a concave head, can be made almost spherical, so that the entire explosion force is exerted directly upon the piston; moreover, as there are no cavities in the cylinder head, carbon has very

little chance to collect, and any small deposit that does form is, so the makers state, actually beneficial to the engine.

In the Knight model, therefore, we have a motor which dispenses with the motor cyclist's two bugbears—valve grinding and decarbonising—to say nothing of its silence, long life, and numerous other advantages.

Another point: Am I not right in thinking that the Knight design lends itself peculiarly to aluminium construction? Cylinder (with detachable head), piston, and sleeves (excepting, perhaps, the inner one, which, formed of steel, would replace the liner which seems to be indispensable in other types) could be cast from this alloy, and, if properly designed, should result in a delightfully cool, sweet-running, and efficient engine.

To my mind, the following features should be included in the ideal motor cycle: Three or four-cylinder Knight engine with clutch and gear box in one unit, front and rear leaf springing, shaft and worm gear drive, 28 x 2½ in. wheels with rustless rims and spokes, throttle-controlled mechanical lubrication, hub band brakes on both wheels, roller bearings in hubs and head, and adequate mudguarding; finish to be khaki shade enamel, with red or green lining, and very little plating.

Such a motor cycle should be in many respects an improvement on the Henderson—at present without a rival—and I live in hope that some enterprising British concern will win for itself the premier position in the motor cycling world by producing huge quantities at a reasonable price.

Toronto, Canada.

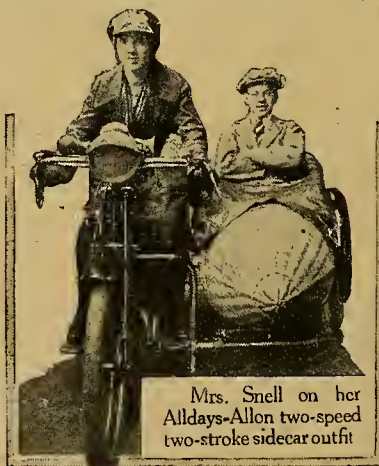
WALLACE R. WARNE.

## A LADY SIDECARIST.

Sir,—I am sending a photograph of my wife driving her Alldays-Allon 1916 two-speed two-stroke 2½ h.p. combination. The sidecar chassis is a Watsonian lightweight. The body I made myself

- of Aster cane, having been apprenticed to this trade.

The sidecar complete can be removed from the machine within five minutes at any time, or replaced in a little less time than that, my wife fitting and refitting it herself, without signs of overstraining herself in any way. She has driven approximately 2,000 miles, and speaks highly of the wonderful engine for a two-stroke. Last winter three times she made the journey



Mrs. Snell on her Alldays-Allon two-speed two-stroke sidecar outfit

to Manchester and back, and on one occasion returned whilst it snowed 75% of the journey, the sidecar being utilised for carrying material required urgently in the construction of balloon cars. The machine in question is not a free engine model, but my wife adds, “This is not necessary,” as she has driven through London traffic and over Westminster Bridge, also by the Elephant and Castle many times.

Leicester.

FRANK H. SNELL.



**RADIATION OR CONVECTION?**

Sir,—*Re* the discussion on aluminium and air-cooling which is being carried on in your paper, I notice L. J. Voss, in your issue of September 13th, suggests a dead black finish on the cylinder as having better radiating properties than a polished surface. But is the heat actually dispersed by radiation? Practically all motor cyclists know that radiant heat travels *without the help of matter*, and it is also common knowledge that the greater the blast of air on to the cylinder the greater the cooling, which seemingly points to the cooling being by convection. By what, therefore, is the cooling affected—radiation or convection?

W. H. LATHAM.

**A VERY DANGEROUS CORNER.**

Sir,—May I draw your attention to the fact that the policeman on point duty at some of the worst corners about here (Netheravon) are removed at 7 p.m.? It seems to me that this is hardly wise, especially during the week-end, when the roads are so full of vehicles carrying not alone all the happy people who can get leave, but the poor M.T. drivers who cannot.

May I relate a little incident? One Saturday night recently I was riding into Salisbury with evening mails, about 7.30, and came to one of these very bad corners. I waited and watched for the friendly figure of the constable in his usual place to direct me on, but there was no one there. I crept round the corner at last, but my precautions were in vain, for I met, somewhat violently, a large touring car. I will not state here on which side of the road or at what speed it was going, but as things were the unavoidable crash that ensued would never have happened if the point were there.

Needless to say, my P. and M. and I, being the lesser movable force, were counted out. I have been told since that more accidents occur on that corner than almost anywhere else on the Plain.

Now I think that on a place like that the point should not be removed in the evening till the traffic on the roads is clear, or, at least, very much diminished, and I want to know if other motorists agree with me, and what can be done to remedy the existing state of affairs.

(Mrs.) SOPHIE C. ELIOTT LYNN.

**THE SINGLE V. THE FLAT TWIN.**

Sir,—I would respectfully point out to your correspondents—"Wireless Section Officers"—that they are under the same misapprehension as that which seems to prevail at Headquarters.

The unfairness of comparing a 550 c.c. engine with a 350 c.c., a 1913 model with a 1916 model, a clutchless two-speeder with a handle-bar-controlled three-speeder, never seems to have struck them.

Furthermore, I am given to understand that, although Messrs. Douglas Bros. make a 4 h.p. three-speed clutch model, such is never ordered by the authorities unless fitted with a heavy sidecar.

I am somewhat interested in this latter model, as I have one of the first  $3\frac{1}{2}$  h.p. Douglas motor cycles, which I bought second-hand two and a half years ago.

Since I have had it, nearly 25,000 miles have been covered on it, as it has been at work day and night with a sidecar attached. Indeed, I have not had the sidecar off or the engine cleaned since February last. My weight is now fifteen stone (it has been over sixteen stone), and during five years I exclusively rode the  $2\frac{3}{4}$  h.p. Douglas without clutch, but fitted with two speeds. I frequently found field tracks where the low speed failed to pull me through. These, however, are easily negotiated with a third emergency speed and clutch.

My son, who has been despatch riding in France since 1914, weighs about nine stone. He has a wasted left arm and an injured right leg, owing to having been blown off his machine in 1915 by a shell, which took the engine from between his legs. His opinion might be of value, as he is a trained motor engineer. He is at present in a London war hospital, suffering from a dose of the new German poison gas, received from carrying a live German poison gas shell (steadily leaking) on his motor cycle to an experimental station some miles behind the line. Several weeks before he had been changed over from a  $2\frac{3}{4}$  h.p. Douglas to a 4 h.p. Triumph, with 1916 three-speed and handle-bar-controlled clutch. He is in no two minds on the subject, and is emphatic that if fitted with handle-bar clutch and

wide high mudguards, the  $2\frac{3}{4}$  h.p. Douglas would infinitely be preferred by him.

Your correspondents suggest that D.R.'s of six months' standing on any front should be asked to vote—single or flat twin. This vote is, I notice, to be given irrespective of the rider's weight, mechanical knowledge, or previous experience.

As these gentlemen are aware, the D.R. has no choice of machine. He has to ride what is given to him, and if his superior officer chooses to change his mount does so, although it is the D.R.'s life that is at stake.

Imagine a fourteen-stone rider of a clutch model Triumph put on a clutchless Douglas. He attempts to engage the gear with the engine running, and smashes the thing up. He at once damns the flat twin, and gets back on a clutch model.

I suggest that if postcards are sent (and the sending is not looked upon as a breach of discipline) full data should be given as to: (1.) Weight of rider. (2.) Weight of load carried (excluding rider). (3.) Previous experience of rider. (4.) Character of district covered. (Army Post Office and indeed all main road work behind the lines should be excluded.)

Perhaps the technical authorities at the War Office would permit the two leading firms to submit machines of equal horse-power and equipment to be specially tested, and ridden by men who are properly skilled in the management of each make.

As it is, Messrs. Douglas Bros. ought, in my opinion, to feel gratified that two officers working under the most strenuous conditions should think that a decision should be arrived at by the D.R.'s as to which is the better—the 1913  $2\frac{3}{4}$  h.p. clutchless Douglas, or the 1916 4 h.p. handle-bar-controlled clutch model Triumph, used under special conditions, where fast runners are constantly employed because no motor cars of any kind can get through.

CHARLES S. PATTERSON, M.B., M.R.C.S.

Sir,—I read with interest in your issue of September 6th a letter from two Wireless Section officers. I am also a Wireless Section officer, and virtually live on my motor bicycle, and the experiences which your two contributors recount are so exactly the same as my own that I might easily have written the letter myself. I may say here that I have no idea who your contributors are. I heartily concur with them that for the work we get out here anything less substantial and reliable than our trusty singles simply wastes time and money. On the other hand, do you not think the main point of the argument has been lost sight of? I may be mistaken, but I do not think the single v. twin discussion turns upon the make of cycle each engine is found in. To take an example, one is apt to take out a  $2\frac{3}{4}$  h.p. flat twin, run it over roads where gluey mud is over the rims of the wheels, and then damn the flat twin because it will not pull you up a stiff grade. Next day you go over the same ground with a  $4\frac{1}{2}$  h.p. single model, when you will probably have to put in bottom gear and slip the clutch before it takes you up; and you are all for the single.

Should the two be judged on the same basis? I am a firm believer in the twin engine—it is an approach to the ideal or continuous impulse engine—and, as is proved over and over again out here, its even torque saves belts, tyres, chains, gears, and roads. I would never choose a small twin for the work we get out here, because it was never built to stand it; but give us a 4 h.p. solo twin in a really substantial frame and a clutch and a top gear of 5 to 1, then we should hear a different tale.

In conclusion, the first motor bicycle out here is a single 4 h.p. of a certain well-known make; the last motor bicycle out here is the same single 4 h.p. of well-known make. But because an under-powered engine is put in a frame which will not stand the terrible racket it gets, it is not fair to put the blame on the engine in particular or its tribe in general. There is this much to be said for the  $2\frac{3}{4}$  h.p. twin we use—it certainly repays tuning. With an air-tight induction pipe and an extra air tap let into it, there were very few 4 h.p. singles which could leave me behind. You may be interested in the following, which happened here recently: I was walking late at night past a park of lorries, over which a newly joined driver was mounting guard with fixed bayonet. "Halt! Who goes there?" "Friend."

"Advance, friend, and give the countershaft."

B.E.F.

AREE SUB.



### SIDECAR CONSTRUCTION.

Sir,—In reference to Mr. Geo. E. Whiteley's illustration of a streamline sidecar. Is this truly streamline? Writing from memory, in a pre-war article on the aeroplane, I think that the type of strut found by experiment to offer the least air resistance was as shown in fig. 1, the theory being that the final easy passage of the air current was of importance. There are a number of sidecars now on the road having a design similar to fig. 2, this design incorporating both wind cutter and taper tail to a certain degree.

Racing car practice in pre-war days at Brooklands was varied, wind cutting being carried out as far as possible but under a handicap of radiator position, whilst taper tails and slightly bulbous rear ends were favoured.



(1) Section of aeroplane strut. (2) Elevation of sidecar body.

Will experts submit a really streamline design of sidecar? Perhaps I may be allowed to write that the Winson model is very pleasing and smart, the disc wheels giving the sporting touch so beloved of the "bhoys." Ease of cleaning a disc wheel is another good point. Is it not a fact that the air resistance of a wire wheel is greater than that of a plain or disc surface? It would be interesting to know the effect of a strong cross-wind at right angles to direction of travel on a disc wheel sidecar combination. Is the steering in any way affected? Perhaps Mr. Whiteley will state his experience. Usual disclaimer, please. JAS. GARFIELD.

### AVERAGE SPEED.

Sir,—I have been very much amused in reading the various letters in your journal on the subject of average speeds, and I think your readers may be interested in a little experience of my own.

My mount is a 1901 standard model 2½ h.p. six-stroke "Skippit," and has done 157,346½ miles without a single repair or adjustment, except resoldering a few chain links which came unstuck through the extreme heat in Africa.

As pillion passenger carrying is strictly forbidden in the Army, I strapped my passenger to the side of the tank. The luggage consisted of six gallons of beer, a spare frame complete, a driving wheel of a 3 ton lorry, and a packet of chewing gum.

I selected the road from Ménilcourt to Yrapsieres as being little known to your readers, so that I am not likely to be criticised by any other D.R.'s. I started off at exactly seven and a half minutes past two by the clock on the kitchen mantelpiece, and arrived at 7.25 by the orderly room clock, just as the guard was mounting—the canteen steps. I stopped more than two hours for a drink or two; my average speed, therefore, was exactly 56.152 m.p.h. The mile posts in France are very unreliable, so I carefully checked the distance on a map, constructed by a friend who is an expert. As there was no scale marked on the map, I assumed it to be two miles to the inch, but it might have been four miles to the inch, in which case my speed was 112.304 m.p.h. At any rate, I knew I was going very fast. At one time I glanced to the side of the road and I saw what appeared to be a very high railing with its standards all close together, like the teeth of a huge comb. I realised afterwards that these were the telegraph poles on the road side.

On the return journey the back tyre went flat, and on getting down I found that the inner tube had completely disappeared, so I replaced it with cherry stones purchased at a drapers. A little further on I just avoided a nasty spill by looping the loop to get out of the way of a hen which ran across the road and barked at me. Of course, these little incidents have nothing whatever to do with average speeds, but I would like your readers to think that I think that I am "some" knut with a motor bike.

A careful test with half an ounce of petrol in the float chamber (and going downhill) showed that I was averaging

325.71 miles to the gallon, which I consider very economical consumption. I might mention that I always use "Blobs" in my petrol, and I find them excellent.

B.E.F.

ICANTELLEM.

Sir,—I have been following your correspondence, etc., of late in regard to this interesting subject.

Now, in the first place, I do not think such letters as your correspondents write, claiming how *easy* these high speeds are, do any good at all (but probably a lot of harm) to the industry and pastime. Personally, I never have, and do not yet consider it to be at all easy (I do not say it is impossible), to put up times giving such speeds as mentioned by your correspondents "AD 2815" and R. M. Whitehead. As for the latter's ride from Didsbury to Blackpool in the time he states—well, all I can say is that he must be some mechanic first and some rider too, for, as is well known, the roads are vile, and there is quite sufficient town work to bring down his average to quite modest figures. He says he frequently did this run to Blackpool. Well, so did I, and I wonder has your correspondent forgotten the "frequent" meetings he had with a lusty single 3½ h.p., and the many times he saw the back mud-guard of this 3½ h.p. between Preston and Blackpool? It was a Rudge painted all red. Surely he does not forget it? Of course, the Rudge had not done many thousands of miles, neither had it run far without attention, but was always up to form. I used to ride this course practically every day, and I have a fair idea as to what it means to put up such speeds as have been mentioned. I am much surprised we have not heard more of the writers of both last week's letters in the T.T. races and other competitions, and I look with awe to the times when they will be able to come to the scratch with the old boys, whom, strange to say, we never see in print making these wild claims.

In conclusion, I may add I have been on the job a good many years, and had a "shot" or two on fast machines like Mr. Whitehead's, and my present mount is a track Harley, which, if conditions permitted, I am sure could put up and maintain a faster average than his machine can attain at all (of course, on a track, and *not* on congested Lancashire roads).

Perhaps when peace comes the writer may meet Mr. Whitehead, and, if necessary, could no doubt freshen his memory. At present, of course, speeding is "No bon," so we will wait until "after"; but I beg of your correspondents not to make wild claims, which will not improve the already bad enough feeling towards our sporting pastime. Perhaps some of the boys of the old school, who *know* just what it is to sit a bicycle round the island, will express their views on this subject.

I also have a Norton and an Indian, and they are fairly well known down Blackpool way. Now does your correspondent remember?

BERT HOULDING,

PTE. M.T., A.S.C.

### SUMMARY OF CORRESPONDENCE.

Mr. C. Binks, of Eccles, Manchester, writes that he has received several letters from customers, who are now at the Front, asking for information, but giving no addresses.

A SIXTEEN-  
YEAR-OLD

NORTON  
ENTHUSIAST.



Miss Winifred Lindon rode a racing Triumph at the age of thirteen years, and is quite at home on a 7.9 h.p. Indian. She has just completed a 200 miles run on the Norton Brooklands model with a ten stone passenger on the carrier.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of the envelope, and should be kept distinct from questions bearing on technical subjects.

## Magneto Timing.

**Q.** Would you be good enough to tell me the relative position of magneto armature with pole pieces to the contact breaker, also relation of contact breaker to piston? Engine  $2\frac{1}{2}$  h.p. J.A.P., fixed magneto.—H.E.A.

The armature magnets should be just clear of the pole pieces with the points breaking. Try the following timing: Piston 6 mm. from top of compression stroke, points just breaking.

## Multiple Jets.

**Q.** I have been a reader of your paper since I purchased my first motor cycle about ten years ago, during which time I have often come across letters from users of the Binks carburetter, but have seldom seen stated what combination of jets was used. Last year I purchased a Binks carburetter with the idea of making my petrol allowance go further, but up to the present have never been able to find the right combination of jets suitable both for sidecar and solo work. My machine is a 1914 4 h.p. Triumph touring model. The engine is in splendid order throughout. The carburetter collar is a tight fit on the engine stump, so that there is no air leak. The jets I have are 0000, 000, 00, 0, 1, 2, 3, 4, 7, 8, 9, 10. The combination in use at present is 0000, 3, 7, which I find fairly satisfactory for solo work, but useless for sidecar work. The difficulty I have is to get on to the main jet owing to engine knock. This happens whether clean or requiring decarbonising. The engine runs well on first and second pilot jets without extra air, and will tick over on stand. As to fuel, I use whatever I can get, generally a mixture of No. II. petrol and either wood naphtha or substitute—half and half. This mixture I find quite satisfactory with a Triumph Tourist Trophy carburetter, 38 jet, but I should prefer to use the Binks under present conditions to economise my petrol allowance.—TRIUMPH.

If you are using heavy fuels on a single-cylinder machine, you will find it almost impossible to get away from the knock when using a Binks carburetter on the main jet. This is because the Binks carburetter gives a theoretically correct mixture at all throttle openings, whereas with a heavy fuel it is necessary to run with an excessively rich mixture, i.e., cut down the air supply when the engine is on heavy load. The best way to

reduce this tendency towards knocking is to insert  $\frac{1}{16}$  in. packing between the cylinder and the crank case, so as to reduce the compression. The jets necessary can only be decided by a practical road test. We should say that a 000, 5 and 9 would be about right for sidecar use, or you might try 000, 7 and 9. Your present jet appears to be rather on the small side. A larger main jet will probably reduce the knock.

## Coal Gas for a Lightweight.

**Q.** I should be very glad if you would tell me whether you think it possible to run a two-stroke Triumph motor cycle on coal gas for the short distance of two and a half to three miles, as I am doing munition work in the town here, and use the machine for getting to and fro.—A.G.C.

In order to use coal gas on your Triumph lightweight you would have to have some sort of sidecar chassis attached on which to mount the gas bag. We would hardly recommend you to do this on account of wind resistance; with winter coming on, the work would be too much for so small a machine. Of course, an alternative method would be to compress the gas in a steel cylinder, but there are difficulties in this method; moreover, some gas companies will not supply gas for motor use. You would require about ten cubic feet, and the cylinder to contain this would weigh about 7 lb., but need not be bulky.

## IMPORTANT NOTICE.

### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

## Illuminating the Number Plates.

**Q.** (1.) Is it necessary to have the rear number plate illuminated? (2.) Is there any substitute that is obtainable without a licence?—S.A.A.

(1.) The law demands that one number plate be illuminated, but no stipulation is made as to whether it be the back plate or the front. (2.) There is no substitute which can be purchased without a petrol licence, except, of course, such gases as coal gas and acetylene.

## Knocking.

**Q.** On changing up on my  $3\frac{1}{2}$  h.p. three-speed motor cycle I find the engine will pick up better on top gear if I cut down the throttle on changing, but if I change up on full throttle the engine will knock very hard. What is the reason for this? The engine is in good order, and can take full throttle once it gets up speed.—W.J.C.

The reason for this is that you are putting too much load on the engine for the speed at which you are travelling. The remedy, therefore, is either to close the throttle or to accelerate more on second speed before changing up. It is wise always partly to close the throttle when changing up, opening it gradually when the gear is in.

## Difficult Starting.

**Q.** I am using a Grand Prix Morgan, which is slow in starting, both when cold or warm, and I cannot find the reason; everything appears in order. (1.) Can you suggest a reason? (2.) Do you know of anything on the market in the way of a kick starter suitable for a Morgan? The present means with the large handle is rather exhausting for me in a stooping position, as I am not over-strong. One cannot turn the large handle quickly enough to create a sufficiently strong spark. A different arrangement, I think, would be a boon to users of Morgans. This is the only trouble I have with it. Do you know of an alternative method? (3.) The Morgan is water-cooled, and I find the plugs wet up occasionally during a journey. Should this occur, and for what reason?—H.V.

(1.) Difficult starting is nearly always due to too weak a mixture at low speeds, possibly owing to air leaks at the carburetter or induction pipe unions. Sometimes the trouble may be overcome by stuffing a piece of rag into the fixed air intake of the carburetter and withdrawing it soon after the engine has been started. (2.) We do not know of any better way of starting a Morgan than the arrangement turned out by the makers. Of course, there are a good many poor magnetos being sold at the present time, such as the cheaper American varieties and the early experimental British magnetos. This may be the cause of your trouble. (3.) The plugs should keep quite dry. If you find wet on them, especially after the engine has been standing all night, it is almost certain that there is a crack in the cylinder jacket.



**Coal Gas and Acetylene.**

**?** (1.) Will you kindly inform me the approximate distance a 6 h.p. twin and sidecar would go on 120ft. of coal gas? (2.) How many feet of gas will 1 lb. of carbide generate? (3.) Could coal gas and acetylene be safely mixed?—S.C.

(1.) Approximately forty miles. (2.) 4.75 cubic feet. (3.) It would certainly be possible to mix coal gas and acetylene, but there is always a certain amount of risk in using the latter gas in a motor cycle engine.

**A Broken Piston Ring.**

**?** I have a  $3\frac{1}{2}$  h.p. N.S.U. motor cycle, and on dismantling the engine I found the top ring of the piston was broken at the end and a piece about half an inch long missing. (1.) Would this account for bad running and refusal to take hills, even on low gear? (2.) What is the correct gear ratio for this machine? At present it is about  $4\frac{1}{4}$  to 1. Is this low enough, as I very often have a friend on the back?—A.J.S.

(1.) We rather doubt whether the breakage to which you refer would account for the unsatisfactory running, provided the other rings were sound. The only way to decide this is by trial on the road with the new ring fitted. (2.) We should say about 5 to 1;  $4\frac{1}{4}$  to 1 is hardly low enough when taking an extra load.

**Decompressor out of Action.**

**?** I shall be much obliged if you will kindly answer the following questions: (1.) The decompressor on my 1914 4 h.p. Triumph will not work. It is impossible to start the machine with it in operation, and when the engine is running, if the decompressor is put into action, it stops the engine. It is the Triumph standard decompressor. (2.) I propose to re-enamel the chassis of my sidecar with Robbialac, and I have been told that, after the enamel is put on and dried, it should be painted over with some colourless varnish to protect the enamel. Can you tell me if this is advisable, and, if so, the name of the varnish and where it can be procured? (3.) I have a Phoenix coachbuilt torpedo sidecar, and wish to fit a hood and screen. Do you think this extra weight will make much difference? (4.) Would a butt-ended (Dunlop or Palmer) inner tube be quite satisfactory on the driving wheel of my machine? (5.) The upholstery of the sidecar, which was a light grey when new, has become very dirty. Is it possible to have this done up a different colour, say, red or green, without taking the upholstery apart? Is there any preparation on the market for this purpose?—G. LYFORD.

(1.) We would recommend you to look to your carburetter, for—provided the valve timing has not been altered—we fail to see how the operation of the decompressor can cause the engine to cease firing. Possibly the needle valve has moved, and is causing a weak mixture at small throttle openings. The throttle should be very little open for starting, and late in 1914 the Triumph

people took to filing a half moon in the slide, so as to permit a rich mixture for starting. Any derangement of the carburetter might lead to the mixture at certain throttle openings being so weak as not to explode with the decompressor in action. (2.) It is not, as a rule, necessary to varnish after applying a coat of Robbialac, though it might perhaps render the surface more durable. The Robbialac people supply a special varnish, or ordinary carriage varnish will do. (3.) The weight would make no difference, though with the hood erected the head resistance will be very much increased, especially when riding against the wind. (4.) Butt-ended tubes are not generally so reliable as the ordinary continuous, and we do not think there is much object in using them when the rear wheel is reasonably accessible. (5.) No, you would have to take the upholstery down in order to have it stained. A special preparation for re-viving leather can be bought. It is called "Coptic" Leather Reviver. We know of no stain that can be applied.

**Gudgeon Pin Position.**

**?** I have a Monopole-Villiers, which at present I am overhauling. Would you kindly enlighten me on the following? (1.) Which way up should the hollow gudgeon pin be—the lubricator hole facing the piston head or facing downwards on to the piston rod small end bearing, and why? (2.) Is there a means of testing the Amac carburetter by a special device, and is No. 25 the smallest jet?—C.E.S.

(1.) It does not really matter a great deal which way the hole in the gudgeon pin faces; the best position would probably be facing downwards, as its object is, we presume, to conduct oil from the cylinder to the small end bearing. (2.) Yes, the Amac people supply a tube for testing the level in their carburetter. This instrument affords the only means of ascertaining the petrol level which, in this carburetter, is above the top of the jet. No, a 25 is not the smallest jet, but it should be small enough for your engine.

**READERS' REPLIES.****Difficult Starting.**

I have experienced the same difficulty as "S.W." describes in your issue of 13th September. If the machine is fitted with Dixie magneto, and if the points are set wide apart, it will go off at first kick. I tried every means, and found out that points as per instructions are set so close that it is almost impossible to start with kick starter. Would like to know if this overcomes the difficulty.—D. McK.

I have a B.S.A. Model H machine, and have no trouble whatever in starting up, even on a cold morning. I can start with one kick of the kick starter or a push off at walking pace. I will now give a few particulars, and trust they will be of benefit to your correspondent. Well, to commence with, I have the jet half a turn open, the magneto lever two-thirds retarded (this is timed to fire, when fully advanced, at 8 mm. from the top of compression stroke), the throttle lever a third open, and the air lever closed. As soon

as the engine has started, I almost close the throttle and half open the air; I then can regulate to suit the conditions of the roads. On the level road I can always run with the air lever fully open and the magneto fully advanced. I shall have great pleasure in giving your correspondent any further tips that are in my power.—E.H.C.

I think probably "S.W.'s" trouble is that his petrol level is too low; it is easily adjusted by the screw nut provided, and should not be more than one-eighth of an inch below the top of the jet when the jet regulator is out. In effect the level is much higher when the regulator is in. I am using benzole substitute now, and find it easy to start from cold (provided the piston has been freed well) by squirting a little petrol from an oilcan on the intake gauze. Recently I soldered a small piece of one-eighth of an inch copper tube to the gauze frame in such a way that it conducts the squirt of petrol right on to the jet; this also works well, and will start first kick, after which the substitute will keep the engine going. "S.W." might, with advantage, see that the air cable is properly adjusted. When the handle is in closed position the air (rear) barrel should be about three-eighths of an inch open—if much more the mixture will be too weak, and if much less, it will be drawing in practically pure petrol, as this is the only air inlet to the carburetter. Also, is "S.W." sure that the throttle barrel begins to open when the handle begins to move? If not, the handle may show half throttle when it is really not one quarter.—W.H.M.

**RECOMMENDED ROUTES.****BIRMINGHAM TO COLWYN BAY.—G.W.**

Birmingham, Halesowen, Stourbridge, Bridgnorth, Shrewsbury, Ellesmere, Wrexham, Mold, St. Asaph, Abergelle, Colwyn Bay. Approximately 120 miles.

**ONGAR TO SHIPLEY.—G.H.A.**

Ongar, Harlow, Stanstead Abbots, Ware, Puckeridge, Buntingford, Royston, Caxton, Huntingdon, Stilton, Wansford, Stamford, Grantham, Newark, Tuxford, Retford, Bawtry, Doncaster, Ferrybridge, Aberford, two miles south of Wetherby turn left for Harewood, Otley, Shipley.

**NOTTINGHAM TO CARLISLE.—A.T.W.**

Nottingham, Mansfield, Worksop, Doncaster, Ferrybridge, Wetherby, Boroughbridge, Ripon, Masham, Askrigg, Hawes Junction, Kirkby Stephen, Appleby, Penrith, Carlisle. We can recommend the above as being a delightful ride, but it would be slightly quicker to turn to left before reaching Wetherby, and go through Otley, Ilkley, Skipton, Settle, Ingletton, Kendal, and Penrith.

**ILFRACOMBE TO IPSWICH.—E.E.J.**

Ilfracombe, Blackmore Gate, Simonsbath, Wheddon Cross, Dunster, Williton, Bridgwater, Glastonbury, Shepton Mallet, Frome, Trowbridge, Devizes, Marlborough, Hungerford, Newbury, Theale, Reading, Maidenhead, Slough, Denham, Rickmansworth, Watford, St. Albans, Hatfield, Hertford, Ware, Bishop Stortford, Gt. Dunmow, Braintree, Colchester, Ipswich.



# MAGNETOS

## LIMITED

**SAMPSON ROAD NORTH, BIRMINGHAM,**

are the producers of

**THE FAMOUS E.I.C. MAGNETOS**

which are

**EVERY BIT BRITISH.**

The Circle of admirers who never tire of praising the "Norton" is wonderful in its extent—and it is constantly expanding. Those who are eager to secure the post-war Norton will find their patience rewarded in the improvements embodied in the new Solo and Sidecar models. 3½ h.p. and Big Four.

**NORTON MOTORS, Ltd.,**  
Phillips Street, Aston, Birmingham.  
Telegrams: Nortomo, Birmingham  
Telephone: East 830.

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**G. B. BARTLETT & CO., 74,**  
Gt. Portland St., W.1.

THE UNAPPROACHABLE  
**Norton**  
Single

# Transfers

for  
**Motor Cycles and Sidecars**

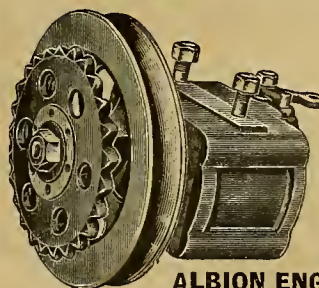
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**ALBION.**



**ALBION ENGINEERING CO., Ltd.,**  
Upper Highgate St., BIRMINGHAM.

*In answering these advertisements it is desirable to mention "The Motor Cycle."*



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd.**, and crossed **& Co.**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**A**BINGDON King Dick Combination, 2 speeds, clutch, handle starter; £26.—211, Queens Rd., Peckham, S.E. [X5852]

### A.J.S.

**A**J.S. Spares: prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X2305]

**1916 A.J.S.**, T.T. model, 2-speed, kick start, very good condition; £43/10.—Walsall Garage, Walsall. [X5858]

**A.J.S.**, 1916, 2½ h.p., 2 speeds, Lucas horn, etc., mileage about 1,000, as new; £50.—633, Bath Rd., Bristol. [X2666]

**MAY** (1917) 6 h.p. A.J.S. Combination, with insurance policy, receipt total £110, what offers?—Box 1,266, c/o The Motor Cycle. [X5790]

**4 h.p. A.J.S.**, late 1916, 3-speed, kick start, clutch, very little used; owner called up; cost £85, accept £65.—Nixon, Brompton, Cumberland. [X5949]

**1914 A.J.S.**, 6 h.p., 3-speed countershaft combination, hood, luggage grid, lamps, horn, in excellent condition; owner joined H.M. Forces; 65 gns.—P. Driscoll, 58, Woodfield Rd., Ealing, W.5. [X472]

**A.J.S.** 1913 Combination, 6 h.p., 20 gns. Gloria coach-built sidecar, scarcely used since war began, newly overhauled, every part guaranteed, new Lucas lamps, and new Dunlop tyres, the engine remanufactured; a trial any distance; £60.—Box 1,255, c/o The Motor Cycle. [X5581]



**87-91, John Bright Street,  
BIRMINGHAM.**

'Phone: Mid. 662. Wires: Lylcar, B'ham.

That's the spot where you can solve your Lightweight selection difficulties. All the best await your test. Liberal Exchanges. Immediate Deliveries. 'Phone for appointment. Closed at 1 on Saturdays.

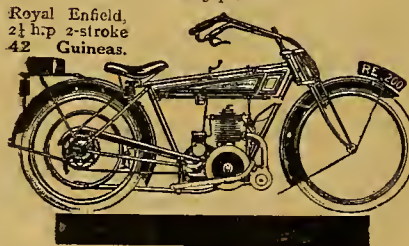
Controlling Birmingham Agent for  
**INDIAN, ENFIELD, ROVER,  
BAT, NORTON, ZENITH,  
NEW IMPERIAL, A.J.S.,  
CONNAUGHT, CALTHORPE.**  
Also Agent for Triumph and James.

Note a few waiting your examination:

<b>CONNAUGHT</b> , 2½ h.p., 2-st. £28 17 6
<b>CONNAUGHT</b> , 2½ h.p., 2-speed £36 6
<b>ENFIELD</b> , 2½ h.p., 2-sp., 2-st. 42 gns.
<b>ENFIELD</b> , 3 h.p., twin, 2-speed 55 gns.
<b>ENFIELD</b> Combination ..... 90 gns.
<b>JAMES</b> , 3½ h.p., 3-sp., twin .. £67 10
<b>JAMES</b> , 4½ h.p., Combination £86 6
<b>NEW IMPERIAL</b> , 2½ h.p., 2-sp. £43 19
<b>NEW IMPERIAL</b> , 2½ h.p., clutch £48 6
<b>NEW IMPERIAL</b> , Lady's ..... £50 8
<b>ROVER</b> , 3½ h.p., T.T., Philipson ..... £62/17/6
<b>ROVER</b> , 3½ h.p., T.T. racer. £57 10
<b>ROVER</b> : 3½ h.p., cut'n'sh'ft, 3-sp £73 10
<b>ROVER</b> , 3½ h.p., 3-sp. Comb. £94 10
<b>CALTHORPE-J.A.P.</b> , 2-speed £33 18
<b>CALTHORPE</b> , lady's, 2-speed £37 16
<b>CALTHORPE</b> , 3½ h.p., coach Combination ..... 70 gns.

\* Plus 5 per cent.

Royal Enfield,  
2½ h.p. 2-stroke  
42 Guineas.



SEE  
**ELITE RUBBER CO. LTD.'S**  
Column Advertisement in this issue  
for SPECIAL BARGAINS in  
**TYRES.**

## 'Hints and Tips for Motor Cyclists.'

Brimful of useful information.

Price 1/6

By post 1/8

Home or abroad.

**ILIFFE & SONS LTD., 20, Tudor St., E.C.4.**

## MOTOR CYCLES FOR SALE.

### A.J.S.

**A**J.S. 6 h.p. Late 1914 Combination, perfect running order and good condition; £58, or nearest.—Town end, Chappel Farm, Crick, Rugby. [X585]

**L**ATEST A.J.S. 6 h.p. Combination, super-sidecar with extra seat, all spares and accessories, only done 1,300 miles; £100.—31, Griffiths Rd., Wimbledon. [X84]

**A**J.S. 1915 4 h.p. Combination, including best lamp speedometer, horn, overalls, etc., done less than 2,500 miles; cost over £100; beauty; only wants seals.—Box 1,276, c/o The Motor Cycle. [X596]

**A**J.S. 1914 6 h.p. Combination, hood, screen, speedometer, lamps, horn, condition perfect; £77/10 exchanges, deferred payments.—Lamb's, 151, High St. Walthamstow, and 50, High Rd., Wood Green, N. [X83]

**1915 4 h.p. A.J.S.** Combination, clutch, kick start, 3-speed, hood, screen, Binks carburettor, mechanical horn, speedometer, mileage 3,750; £70, lower.—Horsfield, 159, Rochdale Rd., Firgrove, Rochdale. [X53]

**A**J.S. 1914½ 6 h.p. 3-speed Combination, hood, screen, lamp, speedometer, horn, detachable wheel, privately driven, mileage under 4,000, new Ro combination tyre; £77/10.—Nesbitt, Fern Ban Orpington. [X85]

**1916 A.J.S.**, 2½ h.p., 2-speed, touring model, kick starter, hand controlled clutch, lighting set, horn, spare tank, tools, a genuine machine, in tip-top condition throughout; £46.—J. C. Phipp, Sherston, Malmesbury, Wilts. [X82]

**A**J.S., 2½ h.p. (1915), with 3-speed countershaft, gear, clutch and kick starter, engine recently overhauled, tyres in good condition; £47/10; extended payments arranged.—Harrods, Motor Showrooms, 11, Brompton Rd., London, S.W.1. [X84]

### Alldays.

**C**OLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [X75]

**1916 Allon**, 2-stroke, lamps, horn, etc., perfect condition; £20.—Montgomery, Victoria Room Bristol. [X592]

**1916 Alldays Allon**, 2½ h.p., single-speed; bargain £19.—Elce and Co., 15-16, Bishopsgate A.C. Camomile St., E.C.3. [X595]

**RIDER TROWARD** and Co., 31 and 78, High St. Hampstead.—1916 Allon 2½ h.p. 2-stroke, speed; 26 gns. (D) [X597]

**1912-13 Alldays**, 3½ h.p., F.E., clutch, Bosch, B. or D., new Dunlop tyres and belt, lamps, horn, spares, splendid condition; photo; £22.—75, Kennington Rd., Coventry. [X586]

**ALLON** (new), 2½ h.p., 2-stroke, all models in stock for immediate delivery; the standard lightweight extended payments arranged.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [X83]

**ALLON**, 1915, 2-speed, 2-stroke, pan saddle, £39/10 single speed (new), £36: 2-speed, new, £42: 2-speed and hand clutch, new, £43: extended payments or exchange; Alldays Allon, 1915, 2-speed, Dunlop tyre, enamelling and plating good, £30/17/6.—Service Co. 292, High Holborn. [X601]

### Ariel.

**A**RIEL, 3½ h.p., 1917, 3-speed countershaft model in stock.—Crow Bros., Guildford. [X256]

**C**OLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [X75]

**A**RIEL, 1915, 3-speed, and clutch, 5-h.p., spring seat-pillar, Dunlop tyres, hood and screen, Lucas lamp and Cowey speedometer; £71/15; extended payments or exchange.—Service Co., 292, High Holborn London. [X601]

**1915 Ariel** Motor Cycle, 3½ h.p., sidecar model, 1-speed countershaft, clutch, and kick starter, mileage only 5,700, speedometer, gas and electrical lamp etc., as new; £50.—Gibson, Lyndhurst, St. Mary's St. Lincoln. [X591]

**A**RIEL (new), 3½ h.p., 3-speed countershaft gear clutch and kick starter, decompressor, patent spring seat pillar; £72; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd. London, S.W.1. [X839]

**A**RIEL 3½ h.p. 1912 C.B. Combination (underlugs variable gear, hood and screen, P. and H. lamp Lucas horn, several extras, a smart turnout, and very little used; trial by appointment; lowest £26.—Pryor, 1, Russell Rd., Walton-on-Thames. [X843]

**1914 5-h.p. Twin Ariel**, 3-speed countershaft, chain drive, hand controlled clutch, Binks carburettor, lamps, horn, etc., very good condition throughout, been carefully kept, and looks like new; £48, lowest.—Newton, Meadow View, Farnborough Rd., Farnborough. [X847]

### Arno.

**1916 Arno**, 3½ h.p., T.T., shop-soiled; £40.—Bartlett's, 74, Gt. Portland St., W. [X842]

**32 h.p. Arno**, 3-speed Armstrong hub gear, good order; £20.—Jones' Garage, Broadway, Muswell Hill N.10. [X806]



# MOTOR CYCLES FOR SALE.

## Auto-Wheels

UTO-WHEEL, good running order, new tyre; £7/10.  
 —Day, Bond St., Nunceaton. [X5373]  
 UTO-WHEEL, B.S.A., standard pattern, faultless;  
 £7.—Overrill, Barming, Maidstone. [X5810]  
 UNBEAM Auto-Wheel Combination, 1916, all-black,  
 nearly new; £17/10.—Batchelor, 15, Princes Ave.,  
 Church End, Finchley. [X8324]  
 GENUINE Wall Auto-Wheel, little used, complete,  
 splendid condition; £8/10.—Murray, 37a, Charles  
 Hutton Garden, Holborn. [X5951]  
 UTO-WHEELS.—Three B.S.A. models, £7/10, £9/9,  
 and one a 1917 model at £12/12; also a good stock  
 best makes of push cycles if one required.—Lamb's,  
 1, High St., Walthamstow, and 50, High Rd., Wood  
 Green, N. [X8358]

## Bat.

AT-J.A.P., 8hp., 1912, good running order, chassis  
 to take tradesman's box, £22, or offer.—Dawson,  
 Regents Terrace, Cambridge. [X5925]  
 AT-J.A.P., 7-9hp., racy sidecar, also spare sidecar,  
 Albion pulley, B. and B., perfect order; £18/10.—  
 Dry, Macdonald Rd., Cromer. [X8298]  
 AT-J.A.P., 10hp. twin, Bosch, fast, reliable, good  
 condition; owner in Egypt; £50.—Browne, The  
 Maus, Monument Hill, Weybridge. [X8296]

## Blumfield.

COMBINATION, Blumfield, 3½-4¼hp., water-cooled  
 engine, Armstrong V.I. 3-speed gear, Bosch water-  
 tight mag., large touring tank, coachbuilt sidecar; good  
 gain; £24.—Newman, Hollies, Acoc's Green. [X5843]

## Bradbury.

14 Bradbury Combination, 4hp., C.B. sidecar,  
 N.S.U. 2 speeds, lamps, horn, accessories, Bosch,  
 mag.; any trial; £30.—Smith, Alexandra Rd., Walkden.  
 [X5956]  
 13 4¼hp. Bradbury 2-speed Combination, P.H. lamp  
 set, speedometer, horn, and accessories; bargain;  
 —Neal, Saddler, High Rd., Hayes End, Hayes;  
 Hidesex. [X5865]  
 14 4hp. Bradbury, 2-speed countershaft, chain  
 and belt, H.C. cork clutch, good Dunlops, Ser-  
 belt, very reliable; £25.—West, Popeswood, Bin-  
 der, Berks. [X8256]  
 RIDER TROWARD and Co., 31 and 78, High St.,  
 Hampstead.—1914 Bradbury, countershaft gears,  
 kick-start, smart underslung coachbuilt sidecar,  
 14 gns.; 1912 single-speed Bradbury, good order, 14  
 gns. (D) [X5974]  
 RADBURY Combination, splendid condition, 1912,  
 with 1915 4¼hp. cylinder and carburettor, 2  
 eds, free engine, special Purcell sidecar, with back  
 for child or luggage, large Miller lamp and all acce-  
 ssories; £30; very little used; a bargain.—S., 116,  
 Gotesley Rd., Harlesden, N.W. [X8458]

## Brough.

16 Brough, 3½hp., 2-speed, T.T.; £52.—Bartlett's,  
 74, Gt. Portland St., W. [X8425]  
 RIDER TROWARD and Co., 31 and 78, High St.,  
 Hampstead.—1916 Brough, 3½hp., flat twin,  
 1915 3-speed countershaft, hand clutch, kick-start,  
 new; 59 gns. (D) [X5973]  
 15 Brough Flat Twin, ridden 300 miles only, and  
 as brand new throughout, perfect everywhere;  
 for exchange for 1916 Harley Combination with  
 cash.—Wheeler, 95, Canterbury St., Gillingham,  
 Kent. [X5964]

## Brown.

1hp. Brown, N.S.U. 2-speed, in fine order; £22.—  
 2 Jones' Garage, Broadway, Muswell Hill, N.10  
 (D) [X7068]

## B.S.A.

OLMORE Depots 261, Densgate, Manchester, for  
 immediate delivery of B.S.A. [X7098]  
 1hp. B.S.A., 1914, clutch, Palmers, accessories,  
 2 Lucas lamp; 33 gns.—House, 4, Maduff Rd.,  
 Tersea, S.W. [X5709]  
 RIDER TROWARD and Co., 31 and 78, High St.,  
 Hampstead.—1916 B.S.A., countershaft, chain-  
 belt, coachbuilt combination; 59 gns. (D) [X5975]  
 16 B.S.A. Model H, all chain drive, 3-speed counter-  
 shaft combination, lamps, horn, and all in per-  
 fect condition; £65.—Montgomery, Victoria Rooms,  
 St. [X5929]  
 S.A. 1917 Combination, 3 speeds, chain-cum-belt,  
 wind screen, fast and economical; any exami-  
 nation; excellent condition; £68.—C.B., 61, Station Rd.,  
 Leaden. [X5845]  
 S.A. 1915 Coachbuilt Combination, 3-speed counter-  
 shaft, all chain drive, clutch, kick start, over-  
 lapped, accessories; 55 gns., accept 2-stroke part.—Webb,  
 Hythe Rd., Swindon. [X8474]  
 S.A., late 1914, 4¼hp., all chain, Speedwell 4-point  
 sidecar, Lucas lamps, tyres 650x65, new spares, not  
 1 in winter, in splendid condition; £55.—Rev. Stone,  
 Cairn, Park Rd., Cheltenham. [X5927]  
 S.A., 1915 (late), all chain, and sidecar, mileage  
 2,000, all tools and spares; tyres very good,  
 and enamel as new, a splendid outfit, 78 m.p.g.;  
 £55.—Lawn Bank, Koats Grove, N.W.5. [X8388]

# LAMB'S

for 1917

## ACTUALLY IN STOCK.

MATCHLESS, War mod. 8 h.p. comb., 3-sp £120 0  
 ENFIELD, 1917, 2½ h.p., 2-sp., lamps £44 2  
 ENFIELD, 1917, 6 h.p., hood, screen, lamps £120 0  
 HARLEY-DAVIDSON, 1917, mag., "C" £137 0  
 HARLEY-DAVIDSON, 1917, 7-9 h.p., Sc. £130 0  
 HARLEY-DAVIDSON, 1917, elec., S-car. £140 0  
 ROVER, 1917, 3½ h.p., 3-sp. Comb., S-car. £99 4/6  
 ROVER, 1916, 3½ h.p., 3-sp. S-car. £68 10  
 ARIEL, 1917, 3½ h.p., 3-speed Combination £93 10  
 \*\*LEVIS, 1917, 2½ h.p., 2-speed, Model E £47 10  
 \*\*LEVIS, Popular model £32 0  
 CATHORPE-J.A.P., 1917, 2½ h.p., 2-sp. £39 16  
 ALLDAYS ALLON £37 10  
 ROYAL RUBY, all models from £32 10

## SECOND-HANDS.

ENFIELD, 1914, 6 h.p. Comb., 3 lamps, horn £68 10  
 ENFIELD, 1916, 6 h.p. Comb., dynamo set £110 0  
 ENFIELD, 1916, 6 h.p. Comb., heap access. £89 10  
 TRIUMPH, 1913, 3½ h.p., 3-sp., S-T.T., solo £32 10  
 TRIUMPH, 1914, 4 h.p., 3-sp. S-A. gear, Sc. £48 10  
 TRIUMPH, 1911, fixed gear model, access. £18 10  
 DOUGLAS, 1914, 2-sp. model, accessories £45 0  
 HARLEY-DAVIDSON, 1915, magneto, Sc. £72 10  
 HARLEY-DAVIDSON, 1915, magneto, Sc. £68 10  
 HARLEY-DAVIDSON, 7-9 h.p., magneto £89 10  
 HARLEY-DAVIDSON, 1916, elec., "E" Sc. £89 10  
 SINGER, 1913, 4½ h.p., e-shaft, cane Sidecar £35 0  
 SINGER, 1915, 16, 3½ h.p., e-shaft Comb., k-s. £27 10  
 A.J.S., 1914, 6 h.p. Comb., 3 lamps, w/screen £77 10  
 CATHORPE-J.A.P., 1915, 2-sp., lamps £28 10  
 HAZLEWOOD-J.A.P., twin 5 h.p., 3-sp., Sc. £53 10  
 NEW HUDSON Combination, 3½ h.p., 3-sp. £35 0  
 B.S.A. Auto-wheel £7 10  
 Another, in splendid condition £10 10  
 Also 1917 model £12 12  
 PHOENIX Sidecar £7 10  
 P. & M., 1913, 3½ h.p., 2-sp., k-st., T.T. bars £31 10  
 B.S.A., 1913, 3½ h.p., Swan Comb., lamps £42 0  
 B.S.A., 1915-16 mod. "K" and best S-car. —  
 CONNAUGHT, 1916, 2½ h.p., semi-T.T. mod. £22 10  
 LEVIS, No. 1, 1914, 2½ h.p., single-speed £23 10  
 1916 ENFIELD, very late, 6 h.p., dynamo,  
 Combination, hood, screen, speedo-  
 meter, etc.; condition O.K. —  
 WATSONIAN 2 model "G" Sidecar, new £10 18

\*\* Can only be supplied to those on work of  
 national importance  
 \* Can only be supplied on a Class "A" Certificate.

PUSH CYCLE DEPT.—We have still a good  
 Stock of best known makes from £7 7s. to £14 14s.

WANTED.—B.S.A. Combination, and a FORD  
 Van; also 1917 HARLEY-DAVIDSON.

# LAMB'S,

151, HIGH ST.,  
 WALTHAMSTOW,  
 N.E.17.  
 Also at 50, HIGH RD.,  
 WOOD GREEN, N.22  
 Only depot in this district.  
 Phone: Walthamstow 169.  
 5 minutes Hoes St. (G.E.R.).  
 Hours—9 to 8,  
 Thursdays, 1 o'clock.

# MOTOR CYCLES FOR SALE.

## B.S.A.

B.S.A., 1914, 2-speed, 3½hp., in fine running order,  
 £33/5; 4¼hp., 1916, £57/10; 4¼hp., 1916,  
 with C.B. sidecar £65; exchange or extended pay-  
 ments.—Service Co., 292, High Holborn, London. [X6016]  
 B.S.A. 1915 All Chain Combination, best sidecar, 2  
 Lucas lamps, Jones trip speedometer, spare tyre  
 and sundries, perfect condition, used fine weather only;  
 £60.—Hugh Jackson, 265, Derby Rd., Lenton S.S.,  
 Nottingham. [X5921]  
 B.S.A. Model K, 1916, and their best sidecar, just  
 in; also 1913 model, with 3-speed hub gear and  
 Swan sidecar, heap accessories; £42; deferred payments,  
 exchanges.—Lamb's, 151, High St., Walthamstow, and  
 50, High Rd., Wood Green, N. [X8352]

## Calcott.

CALCOTT, 2½hp., £15/10, or near offer.—Percy, 49,  
 Gladstone Rd., Boscombe, Bournemouth. [X5847]  
 CALCOTT, 1913, 2½hp., single-speed, Bosch,  
 Palmers, excellent condition; £16.—Lindsay,  
 White House, Victoria Rd., Oxford. [X8389]  
 CALCOTT 1914 Lightweight, good order, not used  
 last 12 months owing war service; £16/16, or near  
 offer.—Crisp, Goodwin's Rd., King's Lynn. [X5821]

## Calthorpe.

1915 Calthorpe 2-stroke, 2-speed, lamps; £18.—53,  
 Brownhill Rd., Catford. [X8500]  
 1916 Calthorpe-Jap, 2-speed, as new; £32.—Bart-  
 lett's, 74, Gt. Portland St., W. [X8421]  
 COLMOKE Depots, Birmingham, Manchester, and  
 Liverpool, for Calthorpe motor cycles. [X7099]  
 1917 Calthorpe-Jap, 2½hp., 2-speed, new, just de-  
 livered from works; £41. Walsall Garage, Wal-  
 sall. [X5856]  
 CALTHORPE, 2½hp., 2-speed, free engine; ride  
 away; 1915; £19/10.—152, Camberwell Grove,  
 Camberwell. [X8317]  
 CALTHORPE-J.A.P., 1916½, Enfield 2-speed, lamp;  
 £50, or offers.—Butler, 229, Beckenhain Rd.,  
 Penge, S.E.20. [X8462]  
 1917 New Calthorpe-Jap's, fitted with Enfield 2-speed  
 gear; £39/18; easy payments 2% extra.—Wau-  
 chope's, 9, Shoe Lane, London. [X8527]  
 LATE 1915 2½hp. Calthorpe-Jap, Enfield 2 speeds  
 and free engine, very sporty machine, enamelled  
 Indian red; gift, 23 gns.—30, Talbot St., Burnley.  
 [X5910]  
 1917 4-5hp. Calthorpe-Jap, twin, 2-speed Enfield  
 gear, chain drive, £65, cash; easy payments ar-  
 ranged.—Jones' Garage, Broadway, Muswell Hill, N.10.  
 [X8065]  
 CALTHORPE-J.A.P., 2½hp., Nov., 1916, T.T., disc  
 wheels, £6 equipment, mileage under 800, new con-  
 dition; any trial; reasonable offer.—Manor House, Iffeld,  
 Crawley, Sussex. [X8299]  
 CALTHORPE-J.A.P., 1917, 2½hp., Enfield 2-speed  
 gear, practically new condition, with lamps, horn,  
 accessories, insurance policy; sacrifice £37/10.—George,  
 Westerley, Clevedon. [X5788]  
 CALTHORPE.—1917 models in stock at P. J. Evans,  
 John Bright St., Birmingham, the Birmingham and  
 Midland agent. Two-strokes, four-strokes, and 4-5hp.  
 twin J.A.P. combinations, also ladies' models. [X8212]  
 CALTHORPE-J.A.P., 4¼hp., 1916 twin, Canoelet  
 sidecar, Enfield 2-speed gear, chain drive, handle  
 starting, Klaxon horn, perfect, little used; £55, lowest;  
 seen by appointment.—W. Faint, Scalby, Pound St.,  
 Carshalton. [X8545]

## Campion.

EXCEPTIONAL and Rare Opportunity.—Special 1917  
 8hp. Campion-Jap, not done 1,000 miles, latest  
 Stormey-Archer 3-speed countershaft gear (this type un-  
 procurable until after the war), 50x65 rims and tyres,  
 screw-down greasers to hubs, etc., latest Druids (4  
 springs), electric head and rear lights (accumulator),  
 special Campion 4-point sidecar chassis, light car tyre  
 and rim, fitted with temporary body; cost £120, sacri-  
 fice £87/10 spot cash; no offers.—R. A. Brown, Esq., 11,  
 Higher Albert St., Chesterfield. [X5937]

## Chater-Kerry.

3hp. Chater-Kerry, Bosch, B.B., Hutchinsons, N.S.U.  
 2-speed and free engine, accessories, Saxon forks;  
 £17.—21, Hamilton Rd., Highbury, N.5. [X8373]

## Chater-Lea-Jap

MOTOR Cycle, 8-10hp., Chater-Lea coachbuilt side-  
 car J.A.P. engine, new Dunlop tyres, all in new  
 condition; £40, or near offer.—Box L4,759, c/o The  
 Motor Cycle. [X8540]

CHATER-LEA-J.A.P., 8hp., new 1916, practically  
 new tyres, good supply spares, cane sidecar, splen-  
 did running condition, been taken great care of; £55,  
 no offers.—Advertiser, Newstead, Byron Rd., Nether  
 Edge, Sheffield. [X8332]

## Chater-Lea-Peugeot.

MOTOR Cycle, 5-6hp. Chater-Lea-Peugeot, mud side-  
 car, just been overhauled, and will do 50 m.p.g.  
 on paraffin; accept £35, or exchange for 2½hp. motor  
 cycle, Douglas preferred.—Apply, 33, George Rd., S.  
 Chingford, E.4. [X5851]



## MOTOR CYCLES FOR SALE.

## Chater-Lea-Quadrant.

CHATER-LEA-QUADRANT. 1912, 4h.p. m.o.v., Mabon clutch, new tyres, torpedo cane sidecar, perfect; any trial; 16 gns. or offer: owner serving—128, Camberwell Grove, S.E. [8374]

## Clyno.

CLYNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham and Manchester; inclusive price with spare wheel, 100 gns. [0884]

1914 Clyno, 5-6h.p., and sidecar, 3-speed, new Stewart speedometer, horn, and tools, condition as new; £55.—Dapp, Radlett, Herts., or Redmires Camp, Sheffield. [X5817]

CLYNO, 1913-14, 5-6h.p., 3-speed, and sidecar, P. and H. lamp set, Coway and horn, sidecar complete with spare wheel, £62; 1914-15, 3-speed, 5-6h.p., and sidecar, £69; exchange or extended payments.—Service Co., 292, High Holborn, London. [X6017]

## Connaught.

CONNAUGHT, 1916 model, semi T.T. bars, condition good; deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8356]

CONNAUGHT Miniature, single speed, new, £33/17/6; ditto, 2-speed, £41/6/6; standard 2-speed, £44/9; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6019]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new; 42 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6018]

## Douglas.

1914 Douglas, 2½h.p., 2-speed; £35.—Bartlett's, 74, Gt. Portland St., W. [8424]

DOUGLAS, 1913, 2½h.p., 2-speed Model U.—Ferguson and Batchelor, Perth. [X5953]

DOUGLAS, 2½h.p., equal new: £30.—Flying Officer, 100, High Rd., New Southgate. [X5903]

DOUGLAS, 2½h.p., 2-speed gear: £22/10.—73, Church St., Camberwell Green, London. [8433]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, 1913, 2-speed, accessories, good condition; £29.—47, Hamilton Rd., Reading. [8466]

1915 Douglas, 3-speed, kick start, in excellent condition; £38.—Walsall Garage, Walsall. [X5860]

DOUGLAS, 3½h.p., 2-cyl., excellent condition; cheap.—Autolee, St. Peter's Court, Lee Green, S.E. [8271]

DOUGLAS, 1913 T.T., 2 speeds, overhauled; 27 gns.; accept 2-stroke part.—Webb, 65, Hythe Rd., Swindon. [8475]

DOUGLAS, 1914, 2-speed, clutch, lamps, horn, fine condition throughout; £46/10.—Bates, St. Laves, Bedford. [8402]

DOUGLAS, 4h.p., 2-speed, kick start, sidecar, perfect; £72.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8409]

DOUGLAS, late 1915, 2 speeds, good condition; must sell.—Lieutenant Thomas, c/o Central Garage, Lord St., Southport. [X5954]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

DOUGLAS, 1914, T.T., 2½h.p., 2-speed, perfect; £45.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8103]

1915 4h.p. Douglas, 3 speeds, combination, screen, 2 Millers head lights; 66 gns.—Prince, 49, Longbridge Rd., Barking. [8407]

COLMORE Depots, Birmingham, Manchester, and Liverpool, and Leicester, for earliest delivery of Douglas motor cycles. [0880]

DOUGLAS, 1914 T.T., 2½h.p., 2 speeds, excellent condition, numerous other machines in stock.—Griffin's, 89, Gt. Portland St., W. [8511]

DOUGLAS, 1913, 2½h.p., 2 speeds, T.T. handle-bars, Lucas lamps, £33/10; 1912 2½h.p., 19 gns.—Motor Exchange, Horton St., Halifax. [8337]

1912 Douglas, 2½h.p., single-speed, lamps, horn, speedometer; £15.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0480]

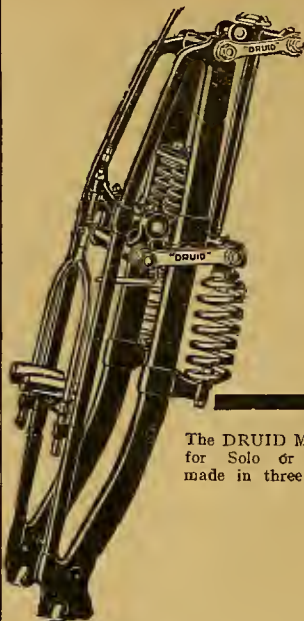
DOUGLAS, 1915 Colonial Model, 3-speed, excellent condition, completely equipped; £42.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [8535]

DOUGLAS, 2½h.p., 2 speeds, late 1913, perfect order and condition, lamps, tools, watch; £31; petrol if desired.—Redfern, Frankville House, Street Lane, Leeds. [X5906]

2½h.p. Douglas, excellent condition, kick start, 2-speed, clutch, very little used; any trial; £30, no offers.—Waddington, South Edge Terrace, Hipperholme. [8382]

DOUGLAS, 2½h.p., 1914, 2-speed, T.T. bars, good tyres, head lamp, generator, very nice condition throughout; £35.—Advertiser, 156, Gt. Portland St., W. [8243]

DOUGLAS, 2½h.p., 2 speeds, complete with lamps, horn, and good kit of tools, just re-enamelled, and in very good order and condition; £37/10; extended payments arranged.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [8401]



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## MOTOR CYCLES FOR SALE.

## Douglas.

1915 Douglas, 3-speed, semi T.T. Lucas lamp, go condition, price 39 gns.; lightweight coachbuilt sidecar for same, £6; no offers.—Ward, 52, Nightingale Rd., Southsea. [837]

1916 Douglas Combination, 4h.p., 3 speeds, lamp, horn, generator, and tools, lovely condition; sacrifice, £62; owner with Forces.—27, Cranmer Rd., Forest Gate, E. [831]

DOUGLAS Motor Cycles.—We can deliver 1913 Model W on receipt of permit.—Eli Clark, c/o Bristol Douglas agent, 223, Cheltenham Rd., Bristol (Wholesale and retail). [08]

DOUGLAS, 1914, 4h.p., 2-speed, clutch, kick start, Amac, lamps, and horn, 1½h.p. sidecar (as new) £60; seen any time by appointment.—F. W. Dadd, 31, Mare St., Hackney, London. [84]

4h.p. Douglas Combination, kick start, 2-speed, clutch coachbuilt sidecar, absolutely perfect; any trial expert examination; £56.—Lt. H.J.T., 16, Lordsbury Park, Stoke Newington, N. [83]

DOUGLAS, 1911, 2½h.p., T.T. handle-bars, for boards, back tyre and belt new, recently overhauled and enamelled, excellent order; £15.—Baumgarten, 1, Saints Vicarage, Newmarket. [X57]

RIDER TROWARD and Co., 31 and 73, High St., Hampstead.—1915 Douglas, 2½h.p., 3-speed, 1 gns.; 1915 Douglas coachbuilt combination, 4h.p., speed, clutch, kick-start, 57 gns. (D) [X59]

DOUGLAS, Jan., 1916, 2½h.p., 3-speed, 1917 Amac, C.A.V. mag., electric lamps, all tools and accessories, fast, and everything in perfect condition thrown out; £43.—Box 1,272, c/o The Motor Cycle. [X58]

DOUGLAS, 2½h.p., 1914, touring model, Box clutch, kick start, in fine condition, £38, at 1914 2½h.p., T.T. bars, Bosch, very fast, in fine condition, £40.—6, Victoria St., Warsop, near Mansfield, Notts. [X59]

DOUGLAS, 1914, 2½h.p., 2 speeds, engine thoroughly overhauled recently, tyres and belt new, 2 hor and lamps, everything in first-class order; what offer Grado vaporiser, inlet 15-16in., not used, what offer.—Stanley Jones, New Milton Hotel, Haats. [84]

2½h.p. Douglas, absolutely new; immediate delivery 4 models U, V, and W, clutch, kick-start, again priority permits, for doctors, farmers, war and munition workers. How and where to apply.—For particulars, write to the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [89]

2½h.p. Douglas, July, 1914, Jones speedometer, Lucas head and tail lamps and horn; nearly new P. mer cord back, undershield fitted, spare valves, be chain, tube, etc., just overhauled privately with extreme care, all worn parts replaced, wheels and necessary parts re-stove enamelled; £39/10; seen afternoons.—Halton Milverdale, Dunmow Hill, Fleet. [X58]

## Edmund.

EDMUNDS (new), 2½h.p. J.A.P., Royal Enfield speed, spring frame, double tank, strongly built machine; £54/12/6; extended payments arranged. Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [83]

## Elswick.

1915 Elswick, 2½h.p., 2-stroke, done 400 miles, lamps and generator complete, 125 m.p.g.; £2 or exchange higher power.—6, St. Andrew's Rd., South Croydon. [84]

## Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2½h.p. 2-stroke; £45; delivery from stock.—Exeter Motor Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [08]

ROYAL Enfield 6h.p. Combination; £55.—71, Oldlands Rd., Cricklewood, N.W.2. [84]

COLMORE Depot, 31, Colmore Row, Birmingham for immediate delivery of Enfields. [08]

ENFIELD Motor Cycles.—Prompt delivery all models.—P. J. Evans, John Bright St., Birmingham. [82]

6h.p. Enfield Combination, in fine order, complete lamps, etc.; £71.—Cross, Jeweller, Rotherham. [X59]

ENFIELD, 2½h.p., 2 speeds, very good condition many others.—Griffin's, 89, Gt. Portland St., W. [85]

ROYAL Enfield 3h.p. Twin, 2-speed, in splendid condition; £32, lowest.—Haines, 169, Lower Clapham Rd., N.E. [X60]

ENFIELD Coachbuilt Combination, guaranteed condition; £37/10.—51, Maplethorpe Rd., Thornhill, Henth, S.E. [84]

ENFIELD 3h.p. Twin, 2-speed, free engine, new tyres fitted for paraffin; £28.—41, King Edward Rd., Walthamstow. [82]

ROYAL Enfield 1916 6h.p. Combination, in top order, complete with lamps, horn, speedometer, guaranteed; £85.—Below.

ROYAL Enfield, 1917, T.T., 2-speed, 3h.p. model, run only 500 miles; 50 gns.—Batchelor, Clarendon St., Kingston. [85]

1916 T.T. Enfield, 3h.p., 2 speeds, as new, lamp, Stewart, accessories; bargain, £42.—Lieut. Brumwick Pier Hotel, Blackwell, E.14. [83]



# MOTOR CYCLES FOR SALE.

## Enfield.

FIELD, 2½h.p., 2-cyl engine, grand going order, comfortable machine: £12, near offer.—J.B., 12, Lion Place, Hartley Wintney, Hants. [8287]

15 Enfield, 3h.p., lamps, horn, speedometer, very good condition: £35.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481]

FIELD, 1915, 3h.p., completely equipped, condition cannot be equalled: price £40.—Longman & Co., King St., Acton. Phone: 1578 Chiswick. [8536]

FIELD Combination, 3h.p., 1916, petrol or paraffin, lamps, speedometer, spare parts splendid: £40.—Morse, 69, Sotheby Rd., Highbury. [8272]

IDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 Enfield combination, perfect, gns.; 1916 Enfield 2-stroke, 2-speed, 27 gns. (D) [X5977]

FIELD 2½h.p. Twin, 2-speed, 1913, Bosch mag., lamps, speedometer, splendid running order: £30, nearest.—Apply, Sagers, Oak Cottages, Halesd., [8385]

16 Enfield Combination, 6h.p., Lucas dynamo lighting, screen, very good condition: £105.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.3. [0598]

16 Enfield, very late, 6h.p., dynamo combination, hood, screen, speedometer, etc., condition O.K.—Bros., 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8548]

FIELD Combination, late 1916, 6h.p., perfect, new condition, with over £20 extras; £95, lowest: £85 out extras.—Shrimpton, 24, Battersea Rise, Clapham Common, S.W. [8284]

FIELD, 6h.p., late 1914, 2-speed, handle starter, good tyres, coachbuilt sidecar, head lamp, generator, rear lamp, fully equipped, and perfect throughout; £125, below. [8516]

FIELD, 2½h.p., 1914, 2-speed, kick starter, all chain drive, Enfield grey, good tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout: bargain, £34.—Mebes and Mebes, 156, Portland St., W.1. [7261]

up. Royal Enfield Combination, in the pink of good condition, chain driven, 2-speed gear included, the best accessories; £55; guaranteed.—Wauchope's, Shoe Lane, London. [8522]

FIELD 1913 6h.p. J.A.P. 2-speed Combination, 3 lamps, large generator, spares, overhauled, 100% trial, guaranteed perfect: bargain, £48.—Read, Iaro St., Bethnal Green, E. [8381]

FIELD 6h.p. Combination, late 1916, mileage 2,000, hood, screen, speedometer, mechanical horn, on seat, backrest, equipped for heavy fuels: £85, near offer.—Oak, "Woodford Times" Office, Woodl., Essex. [8516]

up. Twin 1914 Royal Enfield Combination for sale, genuine Enfield sidecar, fitted with speedometer, ps, horn, and luggage grid, tip-top condition throughout, property of an officer; accept £55.—J. Steers, 68, h St., Crawley, Sussex. [8492]

FIELD 6h.p. 1916 Combination, Palmer cord light car tyres all round, large head lamp, generator, lamp, luggage carrier to sidecar, very nice condition throughout, and fully equipped: £90.—Advertiser, Gt. Portland St., W.1. [7904]

FIELD 1915 Combination, 6h.p., 2-speed, clutch, Thompson-Bennett mag., Amec carburettor, fitted lamps, Stewart speedometer, and horn. £87/10; up. 2-speed, £20; E.P. or exchange.—Service Co., High Holborn, London. [X6021]

ESSRS. Storey and Co. have for sale a late 1916 Enfield combination, the outfit has just had £14 out on overhaul and new set of heavy light car tyres, speedometer, lamp set, spares, a beautiful machine to; £89.—Can be seen 118, Gt. Portland St., W. [X5806]

FIELD, 6h.p., 1917 model, hood, screen, speedometer, 3 lamps, horn, quite as new, £120; also 6 h.p. dynamo lighting model, with hood, screen, 10/0; 1913 6h.p. Enfield, wind screen, and accessories, condition perfect, £22/10; also 1914 6h.p. combination and accessories, condition like new, £68/10; also new 1917 2½h.p., 2-speed, £44/2; exchanges, deferred payments.—Lamb's, Enfield specialists, 151, High Walthamstow, and 50, High Rd., Wood Green, N. [8350]

## Excelsior.

9h.p. Excelsior (American) and sidecar, 1915, in perfect order and condition, very little used: £40.—Ormonde Rd., Hythe, Kent. [8275]

16 7-9h.p. Excelsior, mag., tyres perfect, done 600 miles, owner not allowed to use it; £63, or offer, Cooper, 1, Kensington Garden Sq., Bayswater. [X5804]

EXCELSIORS.—All models in stock; magneto model £75, electric lighting model £85; get a big X will be satisfied.—Colmore Depot, Birmingham, Manchester, Liverpool, and Leicester. [X1462]

AMERICAN Excelsior Combination, new February, 1917, 7h.p., 3-speed, Montgomery spring frame, car, lamps and horn, condition perfect: £75.—The Motor Co., Aston Rd., Birmingham. [8309]

AMERICAN Excelsior de Luxe Model, 7h.p., 3-speed, with dynamo electric lighting outfit and speedometer, £85; special coachbuilt sidecar to match, £20; immediate delivery; liberal exchanges.—The Premier Motor Co., Aston Rd., Birmingham. [8308]

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1913 Clyno, C.B.S./car, lamps, etc. ....	£35 0
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1915 Radco one new tyre, very fine order .....	£18 10
1912 Humber, two-speed, good order .....	£15 0
1912 Abingdon, single-speed, T.T. bars .....	£15 0

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Green Terrace

near Turnham

Green Station,

LONDON, W.



# MOTOR CYCLES FOR SALE.

## Forward.

FORWARD, T.T., 2½h.p., 1914½, overhauled, re-bushed, nearly new tyres, lamps, re-enamelled as new, fast £28, no offers.—Weller, 134, Earlsbrook Rd., Redhill. [X5897]

## F.N.

1913 5-6h.p. 4-cyl. F.N., enamelled red, 2-speed, h.b.c., clutch, extra heavy Dunlops (almost new), complete with sidecar; any trial; £30 cash.—E. Murray, 31, Manley St., Higher Broughton, Manchester. [8258]

## Harley-Davidson.

HARLEY-DAVIDSON, 1916, with sidecar: £78.—Robinson, 5, Sheep St., Northampton. [8451]

HARLEY-DAVIDSON 1915 Combination, 3-speed, Bosch mag.; £50.—Ballantine, 46, South St., Greenock. [8320]

HARLEY 1915 Combination, elaborate turnout; £68.—51, Maltheorpe Rd., Thornton Heath, S.E. Quantity of petrol. [8479]

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [8082]

1915½ Harley Combination, 7-9h.p., 3 speeds, fully equipped, mileage 2,000, as new; any trial; £78.—5, Parade, Belmont, Surrey. Phone: 178. [8460]

HARLEY-DAVIDSON Combination, 1916, excellent condition; great bargain, £82/10.—Longman Bros., King St., Acton. Phone: 1578 Chiswick. [8537]

HARLEY-DAVIDSON Late 1915 Combination, electrically equipped, like new, hood, screen, 2-seated sidecar; £75.—Mitchell, Claremont Gardens, Surbiton. [8297]

1915 Harley Combination, splendid condition throughout; price £65, or exchange for B.S.A., Triumph, or Rover combination and cash.—Park Garage, Hitchin. [X5818]

HARLEY-DAVIDSON, 1915, with Bosch mag., also the electric fittings forming the electric model; offers.—Read Bros., 82, London Rd., Southborough. [8278]

1915½ Harley-Davidson and Gloria coachbuilt combination, in 1916, electrically equipped, Cowey speedometer, mileage under 1,500; any offer over £75.—H.D., Rectory, Berkhamsted. [X5848]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—T.T. Harley, 7-9h.p., 3-speed, disc wheels, khaki finish, dynamo lighting, as new 65 gns.; 1915 standard Harley coachbuilt combination, 65 gns. (D) [X5972]

1917 Harley-Davidson Combination, electric model, speedometer, hood, screen, absolutely unscratched and perfect, indistinguishable from new: £130.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0597]

1915 Model 11F, 7-9h.p. 3-speed Harley-Davidson, Bosch mag., 28×3½in. Goodyear tyres, new Montgomery coachbuilt sidecar, guaranteed in perfect condition: £65.—The Premier Motor Co., Aston Rd., Birmingham. [8310]

HARLEY-DAVIDSON.—Three 1917 models actually in stock; electric model, with H.D. bulbous backed sidecar, hood, screen, £140; two magneto models, one with B. sidecar and locker at rear, other with C. sidecar, bulbous back, both £130 each, quite as new; also 1916 electric model, and H.D. B. sidecar, real bargain, £89/10; also two 1915 magneto models, with sidecars to match, £72/10 and £68/10 each; also 1915 electric model, with sidecar, £75; exchanges, deferred payments.—Lamb's, Harley accredited agents, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8351]

## Hazlewood.

HAZLEWOOD J.A.P., 1914, 5-6h.p., 3-speed, chain-cum-belt, clutch, kick start, new 20 in. C.B. sidecar, accessories; £52/10, or exchange 7-9h.p. Indian.—Tebbs, New Rd., Netherton, Dudley. [X5920]

HAZLEWOOD 1915 Combination, 5-6h.p. J.A.P. engine, 3-speed clutch, and kick starter, Lucas lamps, speedometer, special sidecar; £72/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6022]

## Henderson.

HENDERSON Motor Cycle, 10h.p., 1914, in perfect order; £75, or £50 cash and piano, or furs to value.—Sunspeed, 33, Acre Lane, Brixton, S.W. [8255]

HENDERSON, 4-cyl., with Millford Empress sidecar, repainted, ad as new mechanically in all respects, total mileage 6,000, lamps and horn, a few spares; £80; any trial.—Capt. Mortimer, R.A.M.C., Gore Court, Sittingbourne. [8370]

## Hobart.

1916 Hobart-Villiers, 2½h.p., 2-stroke, 2-speed, lamps, etc., splendid condition; £27; after 6.—97, Longhurst Rd., Lewisham, S.E.15. [8459]

HOBART 2-stroke, 2-speed, brand new, only done 200 miles; a bargain, £30, or close offer; must sell; owner called up.—41, Brighton Rd., Croydon. [8461]

HOBART, 1916, 2-speed, 2-stroke, recently overhauled, good running order, spares, tools, new overalls, unused lamps; £30.—Box L4,757, c/o The Motor Cycle. [8531]

## Humber.

1914 3½h.p. 3-speed Humber, lamp, etc.; £35, cash or easy terms.—E. E. Jones (Garages), Ltd., Swansea. [8563]



## MOTOR CYCLES FOR SALE.

## Humber.

**HUMBER** Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

**HUMBER** Lightweight for sale, in good condition, 3 years idle, not ridden 500 miles; £15.—Kyne, Headford, Galway. [8257]

**HUMBER**, 3½ h.p., 2-speed, kick start, very nice condition; £32.—W. and H. Motor Co., Ltd., 237, Deansgate Manchester; [8104]

**1912 3½ h.p.** Humber, overhauled by Humber Co. in 1915, perfect order; £17; will ride 50 miles.—J. Pearce, Woodmanocote, Cirencester. [8291]

**HUMBER**, 1912, 3½ h.p., 2 speeds, spring forks, in good condition, £24; 3½ h.p., single geared, £14/10.—Motor Exchange, Horton St., Halifax. [8338]

**1913 Humber** and sidcar, 3½ h.p., Sturmer-Archer 3-speed, free engine, Stewart speedometer, Millera head light, very little used; £30.—15, Banbury Rd., Lauriston Rd., Hackney. [X5863]

**1917 3½ h.p.** Flat Twin Humber, 3-speed, excellent condition, speedometer, lamps, horn, mileage 1,500; £65; not powerful enough for owner.—7, Balilgate, Alnwick, Northumberland. [X5942]

**HUMBER** 1917 3½ h.p. Flat Twin, War Model, Millford coachbuilt sidcar, 3 lamps (never used), horn, and accessories, only run 150 miles, condition as new; no petrol sale reason for sale; bargain, £80.—6, Church St., Blackheath, Birmingham. [X5785]

**HUMBER**, 3½ h.p., and sidcar, 2-speed, handle start and free engine, new 1913, in perfect and clean condition, had very little and careful use; what offers in cash, or part exchange for A.J.S. 1916-17 combination, 6 h.p., dynamo lighting.—Hutchings, Angel Hill, Tiverton, Devon. [X5707]

## Indian.

**1914 7-9 h.p.** Indian, 2-speed, clutch; £44.—Addison, 16, Sewells Walk, Lincoln. [X5841]

**RED Indian**, 7-9 h.p. twin, excellent condition; must sell; a bargain, £30.—Haines, 169, Lower Clapton Rd., N.E. [X6045]

**INDIAN**, 5 h.p., going order; seen any day 10 to 12, 1 to 7.30; £18.—Coleman, 64, St. John's Rd., Hoxton. [8268]

**1915 7-9 h.p.** Indian, 2-speed, fine condition; £38, or near offer; must sell.—46, Whitehorse Rd., Thornton Heath. [8552]

**INDIAN**, 7-9 h.p., Derwent sidcar, 2 speeds, clutch, very little used; £42, bargain.—Mason, Eastfield House, Haxby, York. [X5838]

**INDIAN** 7-9 h.p. Combination, fully equipped, almost new, beautiful turnout; must be sold; what offers?—Box L4,758, c/o The Motor Cycle. [8532]

**INDIAN** 1915 Combination, 3 speeds, spring frame, lovely machine; £58, or lightweight and cash.—51, Mapletorpe Rd., Thornton Heath, S.E. [8478]

**INDIAN** 1914 7-9 h.p. Combination, Millford sidcar, 2-speed, clutch, kick start, lamps, horn, speedometer, spare tubes, etc.; £40.—Gill, 35, Dale St., Lancaster. [X5842]

**1915 5 h.p.** T.T. Indian, 3-speed, clutch, kick starter, extra fast one, guarantee 90 to gallon, beautiful condition throughout; sacrifice £48.—Else, Dimple, Matlock. [X5932]

**RIDER TROWARD** and Co., 31 and 78, High St. Hampstead.—1916 Indian 2-stroke, 3-speed, clutch, kick-start, 37 gns.; 1915 Indian, 7-9 h.p., T.T. clutch, 39 gns. (D) [X5979]

**INDIAN** 1916 Combination, 5-6 h.p., 3 speeds, kick starter, lamps, horn, Phoenix sidcar, wind screen, used on Sundays only, splendid condition; £65.—Bottle, 358, Wandsworth Rd., Clapham, S.W. [8449]

**1914 7-9 h.p.** Indian Combination, spring frame, 2 speeds, electrically equipped, lamps, horn, speedometer, fitted both for petrol and substitute, handsome turnout; £60, near offer.—Webb, Belmont, Surrey. [8461]

**1916 7-9 h.p.** Indian Powerplus Combination, mileage 2,500, Stewart Warner, Low generator, lamps, guaranteed mechanically perfect, new condition; £82; solo mount part exchange.—630, Lea Bridge Rd., Leyton. [8444]

**1914 7-9 h.p.** Indian Combination, 2-speed and clutch, spring frame, all electric model (electric self-starter, horn, and lamps), in fine condition, mileage 8,000; £48, or close offer.—Whale, 47, Alexandra Rd., N.W.8. [8259]

**1916 5 h.p.** Indian, 3 speeds, hand and foot clutch, kick starter, lamps, horn, and speedometer, extra petrol tank, in good order; owner going Overseas; £52/10.—Lt. Betts, Bracondale, Beech Croft Rd., Oxford. [X5579]

**INDIAN**, 1915, 7-9 h.p., 3-speed, and Swan C.B. sidcar, discs all wheels, electric head and tail lamps, mechanical horn, fitted for substitute; £65, or exchange Enfield or B.S.A. combination.—Lamb, Latham Lane, Gomersal, near Leeds. [X5967]

**INDIAN**, 5-6 h.p., T.T. clutch model, 1911, thoroughly overhauled and re-enamelled, new cylinders and pistons, new studded Dunlops, lamps, horn, tools, in perfect mechanical condition; £35; seen Saturday afternoons.—39, Hardy Rd., Wimbledon. [X5968]

**INDIAN**, 1916 7-9 h.p. T.T. Powerplus, and Indian sidcar, 3-speed, clutch, very powerful, mileage 5,000, speedometer, 3 lamps, hood, screen; bargain, 65 gns.; no offers; any trial.—1, Rosebank Villas, High St., Walthamstow (opposite Gas Co. Showrooms). [8323]



## SIDECAR COMBINATIONS.

**DOUGLAS**, 4 h.p., 1915, 3-speed Combination, 3 lamps, horn, speedometer ..... £66 6  
**INDIAN**, 7-9 h.p., 1915, 3-speed, spring frame, Millford Sidcar to match, all accessories ... £55 0  
**CLYNO**, 6 h.p., 1914, khaki finish, detachable wheels, 3-speed ..... £65 0  
**EXCELSIOR**, 8-10 h.p., 1915, 3-speed, coachbuilt Sidcar, electric lighting ..... £48 0  
**HUMBER**, 8-10 h.p., 3-speed, handle starting, coach-built Sidcar, all accessories ..... £80 0  
**J.H.**, 8 h.p. M.A.G. engine, Millford Sidcar .. £80 0

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**DOUGLAS**, 1914, 2½ h.p., P.H. head lamp ..... £24 0  
**LUGNON**, 1915, 3½ h.p., good tyres, fine solo mount. Cheap ..... £24 0  
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**RUDGE**, 1912, 3½ h.p., fixed gear; very fast ..... £21 0  
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## MOTOR CYCLES FOR SALE.

## Indian.

**1915 7-9 h.p.** Indian, spring frame, mileage 2,000 disc wheels, nickelled cylinders, silencer, pair good, nickel spotless, electric lamps and horn, speedometer, guaranteed perfect order throughout; in cheque £55.—Box 1,271, c/o The Motor Cycle. [X581]

**INDIAN**, 1915, 5-6 h.p., with or without sidecar clutch, 3 speeds, kick start, all accessories, perfect condition, almost new, £57/10, or offer; also 3½ h.p. 1913 Triumph, with Philpiston valve, good order; £11, write, or call after 7 p.m.—1, Clyde St., Redcliffe & dens, S. Kensington. [821]

**1915 3½ h.p.** Indian, semi T.T., 3-speed, bought 1911 original tyre good for 3,000, very fast machine fitted for use of heavy fuels, 55 m.p.h., and 90 m.p.h. wearing parts throughout equal to new, all necessary spares; £47, or exchange A.J.S. or Sunbeam lightweight and cash.—Batten, Treliever, Quinton Rd., Coventry. [X551]

**1916 Powerplus Indian**, T.T. bars, electric and lighting, 5 lamps, beautiful coachbuilt sidcar, Blumel's wind screen, special hood and curtains, electric horn, and ordinary, heaps of spares; this combination is all red, one of the fastest on road, and in perfect condition, mileage very low; nearest to £70 secures it bargain; any trial.—Wallbank, Gleanmore, Canpoek Rd. Wolverhampton. [X561]

## ivy.

**IVY**, 2-stroke, 2½ h.p., 1915, good tyres, full equipped, as new throughout; £23.—Advertise 156, Gt. Portland St., W.1. [392]

**IVY**, 2½ h.p., 2-stroke, single speed, excellent condition throughout; £25/5, exchange or extended payments.—Service Co., 292, High Holborn, London. [X601]

## James.

**COLMORE** Depot, 261, Deansgate, Manchester, has in stock complete range of James motor cycles. [080]

**1915 James**, 3½ h.p. twin, 3-speed countershaft, in start, in splendid mechanical condition; £35. Walsall Garage, Walsall. [X588]

**JAMES** 1915 Twin, perfect condition, new tyres, 1 spares, overalls, etc.; £40, or nearest offer.—Austin 16, Darwin Av., Buxton. [821]

**1916 James** Single, 4½ h.p., 3-speed countershaft, no condition; any trial; £52; good lightweight part exchange.—Williams, Beehive, Eyrthorne, Dover. [X583]

**RIDER TROWARD** and Co., 31 and 78, High St. Hampstead.—1917 James de Luxe, dynamo lighting (Lucas), coachbuilt combination; 79 gns. (D) [X598]

**JAMES** 1913 4½ h.p. Canelet Combination, 3-speed two new tyres, three lamps and generator, mechanical horn, and spares; £35, or exchange.—21, York Rd. Leyton, E.10. [844]

## J.E.S.

**J.E.S.** Motor Cyclette, complete, 22 in. frame, Model 2, quite new; £25.—Mason, Eastfield House Haxby, York. [X583]

## J.H.

**J.H.**, 2-speed, new; £35/14; extended payments (or exchange)—Service Co., 292, High Holborn, London. [X602]

**J.H.**, 1917, new, 2½ h.p., 2-speed, 2-stroke, countershaft; 42 gns.—W. and H. Motor Co., Ltd., 28, Deansgate, Manchester. [841]

**J.H.**, 9 h.p. M.A.G. engine, Jardine 4 speeds, free engine, and new coachbuilt Bromble sidcar; £71.—Motor Exchange, Horton St., Halifax. [833]

## Lea-Francis.

**LEA-FRANCIS**, 1916 twin, 3-speed, countershaft Bosch, Watford speedometer, lamps, and horn, excellent condition; bargain, £45.—Norman, 165, Philadelphia Lane, Norwich. [833]

**LEA-FRANCIS** Combination, late 1913, 3½ h.p. twin J.A.P., overhauled by makers 1916, coach sidcar new 1916, 2-speed, kick starter, clutch, Lucas lamp and horn, spares, tyres good; best offer, solo or combination.—E. Fletcher, 81, Petteril St., Carlisle. [X567]

## Levis.

**LEVIS**, late, 2-stroke, lightweight.—Can be seen, 21 High St., Wimbledon. [844]

**1917 Levis**, Model E, 2½ h.p., Enfield 2-speed, just delivered. £47/10.—Walsall Garage, Walsall. [X585]

**RIDER TROWARD** and Co., 31 and 78, High St. Hampstead.—1916 Levis Popular; 22 gns. (D) [X598]

**COLMORE** Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles (no stock). [080]

**LEVIS**, 1915, 2½ h.p., fine condition, accessories £21; carriage paid.—Waddams, 110, Orchard Rd. Erdington. [X588]

**LEVIS**, 1914, 2½ h.p., as new, all accessories; bargain £16.—Brooks, 213, Stockport Rd., Levenshulme Manchester. [X583]

**LEVIS**, 1915 Popular Model, all accessories, tyres excellent; £19.—Write, Rex Mundy, 32, Knoll Rd. Wandsworth. [854]

**LEVIS**, 2½ h.p., No. 1 Model, 2-speed, chain-cum-belt drive, rubber standard tyres, brand new, in stock for immediate delivery; reduced price £44.—Mebes and Mebes, 156, Gt. Portland St., W.1. [786]



# MOTOR CYCLES FOR SALE.

## Levis.

1917 2½h.p. Popular, hardly used, fine machine, lamps, horn, all accessories; £27.—Cummings, 2, Crescent, Dursley, Glos. [X4752]

13 2½h.p. Levis, Bosch waterproof mag., Dunlop and Palmer tyres, lamp and horn; £17.—The Junior Motor Co., Aston Rd., Birmingham. [8311]

Levis Model E in stock, can only be supplied to those on work of national importance; also Popular Model on a class A. certificate only.—Lamb's, 151, High Walthamstow, and 50, High Rd., Wood Green, N. [8359]

1h.p. Levis, 1916-17 engine, 1912 frame and tank, just repainted, Druid, Bosch, Amac, brand new lamps, ridden 200 miles since engine renewed; owner goes to sea; with insurance until March, 1918; or near offer.—Fotherington, 9, Kendrick Rd., Liding. [8281]

## Lincoln-Elk.

IDER TROWARD and Co., 31 and 78, High St., Hampstead.—1913 Lincoln Elk, 3½h.p., variable, waterproof Bosch, 17 gns. (D) [X5987]

14 6h.p. Lincoln-Elk Combination, 2-speed counter-shaft gear, kick starter, Binks carburetter, Bosch mag., Bramble coachbuilt sidecar, with hood and side rails, tyres good, head and tail lamps, spare valves, etc.; £38.—Platt, Wigan Rd., New Springs, Wigan. [X5769]

## L.M.C.

1h.p. L.M.C., Bosch, Senspray, Auto pulley, accessories, good condition, re-enamelled and overhauled; £12.—Collett, Hyde Mill, Stow-on-the-Wold. [X5808]

## Matchless

ATCHLESS Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881]

13 Matchless, 8h.p., 2-speed; great bargain, £32.—Bartlett's, 74, Gt. Portland St., W. [8427]

WHAT Offers for new Matchless combination at works ready for delivery—Box L4,548, c/o The Motor Cycle. [X8260]

ATCHLESS Model 8B, 1915, splendid condition, lamps, speedometer, coachbuilt sidecar; £73.—Ber, 12, Gloucester Rd., Peckham, S.E. [8295]

ATCHLESS, 1915, 7h.p. M.A.G. engine, C.B. sidecar, Cape cart hood, lamps, speedometer, horn, etc., complete.—Cox, 9, Langton Av., East Ham, E.6. [8453]

ATCHLESS, late 1915, M.A.G. engine, fitted mechanical oil pump, 4 detachable wheels, Lucas dynamo lighting, hood, screen, speedometer, petrol, perfect condition; £93.—20, Stanhope Rd., Sidcup. [8387]

ATCHLESS 1917 Combination, 8h.p., 3-speed, clutch, and kick starter, detachable wheels, including spare wheel, new; £120; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6025]

17 Matchless 8B2 Combination, with spare wheel and tyre, brand new, enamelled standard grey, M.A.G. engine; a splendid opportunity to obtain "the best" at once; £125.—1a, Bloomfield Rd., Plumstead, E.18. [X5914]

14 M.A.G. Engine Matchless Combination, 7-9 h.p., 3-speed, kick starter, first-class condition, new tyres and tubes, set of lamps as new.—Offers to Warren, 72, Courtenay St., Kennington Cross, London, S.E.11. [8367]

ATE 1912 6h.p. 2-speed Matchless Coachbuilt Combination, nursed since 1914, fully equipped, perfectly mechanically, and in 1916 condition; any trial or examination; great bargain, £40.—Roberts, c/o Skeats, (Svenor Rd., Aldershot. (D) [8464]

ATCHLESS 1917 8h.p. Combination, 3 speeds, clutch, kick starter, detachable wheels, including spare wheel, Binks carburetter, and spare petrol tank, lamps, horn, and all tools, only run 150 miles; £115.—1, 1275, c/o The Motor Cycle. [X5861]

ATCHLESS 1917 War Model, 8h.p. J.A.P., 2-speed, spare wheel, topping outfit, £120; also expectations 1918 model of unique specification; exchanges, deferred payments.—Lamb's, 151, High St., Walthamstow, E.50, High Rd., Wood Green, N. [8354]

14 Matchless Combination, 8h.p., 2-speed counter-shaft, all chain drive, new tyres, speedometer, lamps, spare cover, tubes, valves, etc., coachbuilt sidecar, Pillion seat, all splendid condition; £55.—A.M., Cranston Rd., Bermondsey, S.E. Owner bought car. [8297]

## Minerva.

MINERVA 2½h.p. Lightweight, new belt, accumulator, pedals, re-enamelled and plated; £12, or exchange higher power.—55, Barkworth Rd., Rotherhithe, E.7, S.E. [8294]

## Moto-Reve.

8.—Moto-Reve, Druid, Lycetts saddle, new front tyre; must sell.—Ramsey, Chemist, Sunbury. [8454]

## Motosacoche.

OTOSACOCHÉ Lightweight, perfect condition, Grando gear, fully equipped, accessories, etc.; sell exchange low gent's cycle.—102, Torridon Rd., Catford. [8437]

## New Hudson.

1h.p. 1913 New Hudson, Canoleet sidecar; £30.—88, Ashville Rd., Leytonstone. [X5710]

EW Hudson 6h.p. Twin, 3-speed, coach sidecar; £60; perfect.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8412]

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# MOTOR CYCLES FOR SALE.

## New Hudson.

NEW Hudson, 1913, 3½h.p., 3-speed, clutch, in good running order; £34/15; exchange or extended payments.—Service Co., 292, High Holborn, London. [X6026]

6h.p. 1914 Combination; 4-speed Jardine, hand clutch, fitted substitute, speedometer, Lucas lamps, engine perfect, gears running order, but want little attention; sacrifice £45.—Campbell, Buntingford. [8438]

1914 3½h.p. New Hudson, 3-speed Armstrong, re-enamelled, and perfect mechanically; any trial or examination; £29; Flying Middleton sporting sidecar to suit, £25; deposit system.—Roberts, 297, Warwick Rd., Carlisle. [8465]

NEW Hudson, 2 speeds, 2-stroke, with new P. and H. head, and rear lamp, and generator, knee-grips, in very good condition; £30, or in exchange for another machine, cash adjustments either way.—Apply, Albert Swan, Brodick, Cannynhame Hill, St. Albans. [8301]

## New Imperial.

1916 New Imperial-Jap, 2½h.p., T.T. bars, as new; £30.—Below. [8322]

1916 Lady's Model New Imperial-Jap, 2½h.p., 2-speed, kick-start and clutch, as new in every way; £40.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0479]

NEW Imperial, 2½h.p., 2-speed, 1915, rebushed; £24.—47, Hamilton Rd., Reading. [8467]

NEW Imperial, 1917, 2½h.p., 3½h.p., 6h.p. models, in stock.—Crow Bros., Guildford. [2563]

NEW Imperial, late 1916, 2½h.p., 2 speeds, fine condition.—Griffin's, 89, Gt. Portland St., W.1. [8513]

NEW Imperial, 1915, gate change, condition as new; £28, or very near offer.—Lindfield, High St., Crawley, Sussex. [8491]

NEW Imperial-Jap, 1917½, 200 miles, 2-speed, kick, h.b. clutch; £39.—Lieutenant Thomas, Central Garage, Lord St., Southampton. [X5955]

NEW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0839]

NEW Imperial, 2½h.p. J.A.P., 1915, 2-speed, good condition, accessories; £24.—Byfleet Automobile Engineering Co., West Byfleet. [X5926]

1916 New Imperial-Jap, 2½h.p., 2 speeds, footboards, lamps, original Dunlops almost like new; £28; take sidecar anywhere.—31, Mount Pleasant, Redditch. [8322]

NEW Imperial (new) 2½h.p., 2-speed; £40/19, actually in stock for immediate delivery; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [8395]

NEW Imperials, 1917 models in stock; 2½h.p. model, J.A.P. engine, 2 speeds, 59 gns.; also clutch models with kick starters, one shop-soled 2-speed model, 36 gns.—P. J. Evans, John Bright St., Birmingham. [8214]

2½h.p. New Imperial-Jap, 1917 model, kick starter, handle-bar controlled, free engine clutch, includes all the best accessories and tools, ridden under 500 miles; £37/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [8524]

NEW Imperial 8h.p. J.A.P. Overseas War Office Combinations, as described in detail pages 252-3, Sep. 15th issue of this paper, exceptional machine in every detail; immediate delivery from stock; £114/9.—Colmore Depot, Distributors, Deansgate, Manchester, and 31, Reashaw St., Liverpool. [0886]

## Norton.

1916 Norton Big 4, 3-speed, T.T. bars, and sporting sidecar; £70.—Bartlett's, 74, Gt. Portland St., W. [8428]

1916 T.T. Norton, 3½h.p., in very good condition; £45.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 T.T. Norton, unscratched, 47 gns.; 1915 T.T. Norton, 32 gns. (D) [X5984]

1916 Big Four Countershaft Norton, luxurious sporting C.B. sidecar, usual accessories, top-hole condition; 80 gns., no offers.—White, Lieut., c/o Estate Office, 2, Sidbury St., Fulham, S.W.6. [8473]

NORTON, 1916, 3½h.p., T.T. engine, 3-speed, chain drive, electric lights and horn, Bonniksen speedometer, new chains and tyres, all in perfect condition, very fast and flexible; £55.—Woodward, Atchison's Garage, Sale. [X5840]

1916 3½h.p. Norton and coachbuilt sidecar, 3-speed Sturmer-Archer countershaft, P.H. lamps and generator, horn, Stewart speedometer, tyres good, Henderson sidecar with disc wheel, and is in new condition; £65.—Frederick Kirk, Southwell Rd., Rainsworth, near Mansfield, Notts. [8250]

## N.S.U.

£8.—Good running order, 3h.p. N.S.U., Bosch, spring forks, footboards; any trial.—Visick, 9, King's Parade, N.3. [8463]

3h.p. N.S.U., mag., B. and B. carburetter, good tyres, etc., spring forks; gift, 5 gns.—30, Talbot St., Bursley. [X5909]

5-h.p. N.S.U. Coachbuilt Combination, 2-speed, F.E., spring forks, Bosch, wants attention; first cheque £15.—46, Mary Rd., West Bromwich. [X5713]



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## O.K.

1914 O.K., 2½ h.p., 2 speeds, in good condition.—Gorbold, 4, Lifford Rd., Plumstead, S.E. [8334]

O.K. Juniors.—Call and inspect at the N.W. district agent, F. J. Yonaga, 2-3, The Parade, Kilburn. [10910]

O.K. Juniors.—Millards, of Guernsey. Always latest models in stock; sole agent for Channel Isles. [8055]

O.K. Junior.—One or two of these lightweights in stock.—Kinson, Murray, and Co., Pilgrim St., Newcastle-on-Tyne. [8052]

O.K. Junior, J.A.P., 1916, 2½ h.p., 2-speed, good condition: £32.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8416]

O.K. Junior, Mark IV., standard, new, 38 gns.; O.K. Junior, 2-speed, £24; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6028]

O.K. Junior.—Youngs, The Parade, Kilburn, special agents and repair experts. Several of these machines always on hand. Book my judgment and see them as above. [8054]

## P. and M.

1913 P. and M. Coach Combination, 2 speeds, kick starter, chain drive, Lucas lamps, spare tank, tools, spare tyre, fuel; trial by appointment only; £35.—Joy, Park St., Brighouse. [8379]

1914 P. and M., 2-speed, chain drive, with 1916 Mills-Fulford Skiff sidecar, 3 lamps and horn (Lucas), speedometer (Covey), tyres unpunctured, condition excellent; 50 gns., complete.—W. Angell, 255, Dogthorpe Rd., Peterborough. [X5846]

## Peugeot.

5-h.p. Peugeot, B. and B., free engine, new Dunlop tyres and belt, fast, reliable, guaranteed perfect; £11.—Nelson, 470, Wandsworth Rd., London, S.W. [8364]

## Precision.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Precision, 1914, 4 h.p., 3-speed, 25 gns.; 1914 4 h.p., clutch, 19 gns.; 1914 4 h.p., fixed engine, 17 gns. (D) [X5990]

## Premier.

1914 Premier, 3½ h.p., 2-speed countershaft, and sidecar; £35.—Bartlett's, 74, Gt. Portland St., W. [8426]

PREMIER, 3½ h.p. T.T., red, very fast; bargain, £30; called up; any trial.—Box 1,262, c/o The Motor Cycle. [X5718]

PREMIER Combination, 1913, complete, good order; called up; sacrifice £29.—Star, Rylands Row, Wigan. [X5891]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 Premier coach combination, 39 gns.; 1915 Premier coach combination, 47 gns. (D) [X5925]

2½ h.p. Premier Engine Motor Cycle, T.T. bars, round 22" racy tank, vertical engine, free engine model, good reliable machine; £15; guaranteed.—Wanchope's, 9, Shoe Lane, London. [8525]

1914 Premier Lightweight, 2½ h.p., 3-speed gear, clutch, complete with lamps, plating and enamelling as new; £25, or near offer.—Lindfield, High St., Crawley, Sussex. [8493]

PREMIER, 1915, 4 h.p., 3 speeds, countershaft, clutch, kick starter, Watsonian 25" carburettor C.B. sidecar, nearly new oversize tyres, wind screen, storm apron, large lamp set, horn, speedometer, perfect condition; £50.—175, Stockwell Rd., Brixton, S.W. [8436]

## Quadrant.

QUADRANT, 4½ h.p., 1916, 3-speed countershaft, all chain, coach sidecar, perfect; £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8410]

## Radco.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 Radco; 21 gns. (D) [X5986]

1914 2½ h.p. Radco Lightweight, latest type, spring forks, etc., excellent condition; £14.—The Premier Motor Co., Aston Rd., Birmingham. [8312]

RADCO, 2½ h.p., 2-stroke, Dunlops, new back new belt, top-hole, going condition; nearest £15/5.—J.B., 12, Albion Place, Hartley Wintney, Hants. [8286]

## Rex.

TWIN Rex, 6 h.p., m.o.v., and coach sidecar; £23/10.—Motor Exchange, Horton St., Halifax. [8344]

REX 6 h.p. Coach Combination, Roe 2-speed, free; £20 only.—Hubbard, 60, Chalk Farm Rd., London, N.W. [X5803]

REX, 1914, T.T., 6 h.p., just overhauled, repainted and plated; £30; exchange, or near offer.—22, Blithwood Rd., N.4. [8542]

REX, 6 h.p., 2 speeds, coachbuilt sidecar, new tyres, lamps, etc.; £35, or near offer.—Trendwell, Newton Villa, Ellesmere Rd., Shrewsbury. [X5893]

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ROVER, 3½ h.p., mag., B. and B., spring forks, just overhauled; £10/10.—152, Cumberland Grove, Canberwell. [831]

ROVER, 3½ h.p., single speed, late model, in first class condition; £25.—Hailes, 169, Lower Clapton Rd., N.E. [X604]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1917 Rover coachbuilt combination 79 gns. (D) [X598]

ROVER Motor Cycles; immediate delivery latest 3½ h.p. variable gear and T.T. models.—P. J. Evans, John Bright St., Birmingham. [821]

ROVER Motor Cycles, 1917 models from stock £74/10; two only, first cheque secures.—Columer Depot, 211, Deansgate, Manchester. [088]

1914 3½ h.p. Rover Combination, Bosch mag., B.B. new Dunlops, splendid condition; first offer £40 any trial.—248, Forest Rd., Walthamstow. [826]

ROVER, late 1916, 3½ h.p., 3 speeds, countershaft kick starter, Lucas lamps, speedometer, little used £59.—Griffin's, 89, Gt. Portland St., W.1. [851]

ROVER, 3½ h.p., late 1916, 3-speed countershaft, kick starter, head lamp, generator, rear lamp, very nice mount, perfect throughout; £60.—Mebes and Mebes, 156, Gt. Portland St., W.1. [853]

ROVER Brand New 1917 Combination, actually new 1916/46; also brand new 1916 3-speed countershaft model, lamps, horn, £68/10; deferred payments, or exchange.—Lamb's, 151, High St., Walthamstow, and 51 High Rd., Wood Green, N. [855]

## Royal Ruby.

LATE 1915 Royal Ruby, 2½ h.p., 2-stroke, T.T. model, good mechanical condition; 17 gns.—30, Tolbet St., Bursley. [X590]

ROYAL Ruby, 1916, 2½ h.p., 2-stroke, Lucas lamp horn, excellent condition; £22.—W. Hanson, Walsby, Hospital, Dartford. [824]

1916 4½ h.p. Royal Ruby, J.A.P. engine, combination lamps, horn, etc., new condition; £55.—Montgomery, Victoria Rooms, Bristol. [X593]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1917 Royal Ruby, 4½ h.p. J.A.P. Sturmey gears, brand new; 66 gns. (D) [X599]

1916 2½ h.p. Royal Ruby Lightweight, 2-stroke Villier engine, 2-speed, footboards, lamps, and horn £26.—The Premier Motor Co., Aston Rd., Birmingham. [831]

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1913 Rudge Multi, 3½ h.p., in excellent condition £28.—J. Cony, Crocken Hill, Swailey, Kent. [844]

5-h.p. Rudge Multi, very powerful, very fine cone sidecar; £45.—Motor Exchange, Horton St., Halifax. [834]

1917 I.O.M. Rudge, lamps, horn, as new; £70.—Elee and Co., 15-16, Bishopsgate Av., Cannon St., E.C.3. [055]

RUDGE Multi, 3½ h.p., 2-speed, sidecar; bargain, £34.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [841]

RUDGE, 2 speeds, pedal start, Swan coach sidecar speedometer, lamps, perfect; £30.—55, Denma Rd., Peckham. [836]

RUDGE, T.T., 3½ h.p., good order, Seaspray carburettor; £25.—Bailey, 64a, Highbury Grove, Highbury, London, N.5. [839]

RUDGE Multi, 3½ h.p., 1912, first-class running order Watsonian light coachbuilt sidecar; £28.—Lea, 54 Abbey St., Nuneaton. [X593]

1913 Rudge Multi, in splendid order, £31; with sidecar £34.—Joni's Garage, Broadway, Muswell Hill, N.10. Deferred payments arranged. [X594]

1913-14 3½ h.p. Rudge Multi, good tyres, perfect condition and order, very fast and flexible, clutch £24, bargain.—24, Tudor Gardens, Barnes. [845]

1913 Rudge Multi, 3½ h.p., hand clutch, lamps, horn, spares, Montgomery basket sidecar, tyres good all perfect order; £40.—101, Devons Rd., Bow, E.3. [X594]

RUDGE Multi Combination, mechanically perfect good condition, King Road lamp set; £45, or exchange, Douglas, cash adjustment.—Hawson's, 60, Regent St., Cambridge. [X592]

RUDGE Multi, 5-h.p., October, 1916, with 1917 Coronet coach sidecar, 1,600 miles, new condition speedometer, lamps, horn, and tools; £65.—Williamson Chemist, Garstang Rd., Preston. [X590]



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## Buying and Selling.

**A**T the present time when new motor cycles are practically unobtainable, a few words of warning to those who are buying and selling second-hand mounts will not be out of place.

Take the case of the seller first. Obviously, his first aim is to get as good a price for the machine as he can, therefore before selling he should spare no pains to see that it is, and that it looks, in good order. The machine should be thoroughly cleaned, and any parts that require renewal should be replaced. The engine, moreover, should be pulling well, and the machine should look smart and attractive. The seller is just as much open to suffer by fraud as the buyer. He must, of course, see that all his claims for the machine can be substantiated, and he should prove this by a trial run, but unless he knows the prospective purchaser he should not permit him to ride the machine unless a deposit to the value of the machine be made in cash before it is taken on the road, as many cases have been brought to our notice of apparently respectable people viewing a machine, expressing satisfaction, taking a trial run, and never returning.

Secondly, as to the purchaser. The purchaser must likewise protect himself from fraud. He should take for his motto the well-known legal phrase *caveat emptor*, which means *let the buyer beware*. If he has not sufficient knowledge to be able to spot faults in a second-hand machine he should take a friend with him who has had some riding experience.

Just as the vendor has to be careful of being imposed upon, so likewise must the purchaser be on his guard. He must not take everything for granted that he is told, and unless he has a very extensive knowledge of motor cycles he must not accept the date of manufacture without verification. All machines bear numbers on the engine and frame, and if the purchaser sends these to the makers, enclosing a stamped tele-

graph form, he will receive at once the correct date of manufacture.

There is very little risk of fraud if reliable second-hand firms are dealt with, as they have a reputation for fair dealing to keep up; but it is when the motor cyclist is dealing with unknown private individuals that he must be on his guard. Forewarned is forearmed.

## Overheating and the Big Twin.

**"T**HE Critics" in this issue open up a subject we commend to the notice of designers. There is no doubt that the proportion of power lost after some miles of hard riding is greater in the case of the big twin than in the case of the popular type of single-cylinder engine. It is difficult to place one's finger on the exact why and wherefore of this, yet every rider of a big sidecar twin is familiar with that faint flagging on hills succeeding a spell of speed work, and in all probability it is owing to the back cylinder, which occupies a sheltered position, exceeding its best working temperature. Very often the current of air is obstructed not only by the front cylinder but also by the carburetter, and possibly by the legs of the rider, in which case the only reasonable remedy to suggest is the fitting of a small cowl to concentrate the draught equally upon the cooling fins of the rear cylinder.

Unequal oiling would also cause this overheating of one or the other of the cylinders, though in this case it is probable that the front would suffer. Indeed, we have proved in one case at least that the front cylinder of a modern 6 h.p. V twin engine ran at a slightly higher temperature than the back, though it is conceivable that this is not the common order of things.

At all events, it is reasonable to suppose that a perfect system of oiling combined with equalised cooling would add considerably to the power maintenance of big twin engines, and would further tend towards a reduction in petrol and oil consumption.



# SOME NOTES ON PILLION RIDING.

ADVICE FROM AN

EXPERIENCED RIDER.

**A**LTHOUGH riding one kind of a machine or another from 1906 to 1914, up to the middle of the latter year I had no use for pillion riding. Having, however, at that time to spend a few months in Birmingham, I and my wife happened to come across a certain  $3\frac{1}{2}$  h.p. (85x88 mm.) machine fitted with a reinforced lady's frame. It was rather a heavy single-gear machine, and had a foot-operated clutch. We took a fancy to the machine and purchased it. At the same time we arranged with the dealer from whom we bought the machine to look out for a suitable two-speed gear, so that we could fit a sidecar which he had in stock. Two or three weeks passed with no two-speed in sight. We ceased to trouble about it. We had commenced pillion riding.

Up to the time of parting with the machine in 1915, we rode many thousands of miles together. We traversed the leafy lanes of Warwickshire, the night-mare roads of Wolverhampton's slums, the country round Derby and Nottingham, the cobbles of the West Riding, the Great North Road, the Yorkshire dales, and the hills of the Lake District. The run from Leeds to the latter we did many times.

## Take no Risks!

We therefore think we can pretend to some experience of serious pillion riding. We rode on all kinds of roads, in all sorts of weather. Our longest run in any day was 150 miles, and we were in the rain four or five hours on that occasion.

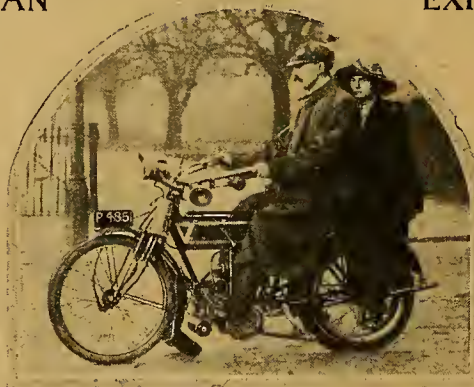
I found no difference from solo riding, except on very greasy roads, provided that I kept speed down to about 80% of what I could manage when driving alone.

My regular passenger is about 75% my weight, and this introduces another factor which has its effect on steering, *i.e.*, the ratio of the weight of passenger to driver. Personally I do not care for taking anyone on my carrier who is heavier than myself. Indeed, I object to taking "strangers" at all. In the regular use of the pillion seat by the *same* passenger the factor of safety rises nearly to that of solo riding at equal speeds. Driver and passenger become so *en rapport* that ordinary events tending to upset steering or balancing are negligible.

It is wise, however, to observe the following precautions. Take no risks whatever. Every solo rider takes some. See that your back tyre is pumped up hard and fitted with security bolts. I ruined two good tyres before fitting the latter, but afterwards had no trouble. A good clutch, either operated by handle-bar lever or foot-operated, is almost a *sine qua non*.

## Comparison with the Sidecar.

How does pillion riding compare with sidecar? For comfort of passenger on a long journey it does not



compare at all: the sidecar has it every time. In regard to safety—or danger, whichever term you prefer—there is nothing in it to my mind. What you gain on the swings you lose on the roundabouts. Most of the accidents which have occurred with sidecars would not have happened with machines requiring only solo width of road. I have been in three traps (not speaking of the police variety) before I had the least possible chance of pulling up. In each case I squeezed

through where I could not possibly have done with a sidecar. Something would have had to give. Again, sidecar frames and connections have been known to break, and—I do not want to make anybody nervous, but it does seem as if the passenger generally comes off worst in a sidecar accident.

## The Cheapest Form of Travel.

As shown above, it is wise in pillion riding to keep to the same passenger, or at any rate to discriminate. With the sidecar this is not necessary. Where the same passenger is concerned I have often found pillion riding very convenient for short-distance work, and taking my passenger to neighbouring towns in a morning or at mid-day and returning for her at night, thus dispensing with trains, etc. This can be done with the sidecar, but with the latter fitted one inevitably does a tremendous amount of "empty" running, which in summer time at any rate could just as easily and much more economically be done solo.

As regards cheap motoring, or cheap travelling, pillion riding is, of course, *sans pareil*. We used to do 110 miles on one gallon of benzole. This with two up is about as cheap a method as I know of covering the ground.

Summing up: Pillion riding is handy, convenient, and cheap for two persons if taken seriously, but from the passenger's point of view it simply cannot compete with the sidecar for comfort and protection from weather. It is not looked upon favourably by the manufacturer, by the general public, or by the great majority of motorists, consequently it will never be *de règle*.

Another disadvantage in carrying a passenger on the carrier is realised when taking long journeys which necessitate staying from home overnight, when it is impossible to carry luggage. This is a very real objection, for except on very short jaunts one almost invariably has something to be mounted upon the carrier, and which cannot well be carried otherwise.

ENGRO.

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## Occasional Comments

Sydney Jones

"By Ixion."

### The W.D. Triumph on the Road.

**D**ESPITE the fact that my normal attitude towards the single-cylinder is a trifle jaundiced, I must admit that the W.D. Triumph is a rare slogger. In company with a colleague we took one for a 120-mile spin the other day, lumbering it up with a very heavy sidecar and two big men, and we were not on the top of the road either, as there had been a good deal of rain. The machine was by no means tuned up, and had seen a lot of knocking about, but the way in which it slogged away on top gear was an eye-opener. It was quite game to keep on all day at a 27 or 28 m.p.h. gross average; it never showed the faintest sign of getting tired in the face of the adverse conditions, and when it came to a prolonged climb of the "can I do it on top?" order, there was no konk or pink; it merely asked for a spark retard, and slogged away solemnly over the crest at a slightly reduced speed. There is no question but that more refined types of engine will not easily oust the vertical single from its top-dog position when sustained hard work is the order of the day; that they will do it, I firmly believe, but they will not find it easy. I suppose, too, that before long the best singles will have spring frames, and then we shall be in a better position to judge what percentage of their vibration is due to the road and what to the engine. In that respect there are great variations between different makes; but it struck me that the bulk of the Triumph vibration originated with the road, and that its engine evinced remarkable smoothness for a single. There was a slight period in the engine under notice at about 32 m.p.h., but I am not sufficiently familiar with the W.D. Triumph to know if this was peculiar to the sample I handled, or common to the breed. Some singles evince an engine vibration which you cannot call a "period," because it is equally apparent at all speeds.

### Outpaced by the Light Car.

**A** 1915 light car accompanied us on the above run. It was a 1915 model, turned out by a manufacturer who puts no premium on speed, so that its fastest gait is barely over forty, though it can keep up something very near this speed all day on the level. Wishing to keep together, we arranged for the car, as presumably the slower 'bus of the two, to lead the way; but the sidecar outfit had to "go like blazes" to keep the small car in sight. Now this raises an interesting point. The Triumph people hold that no twin (and *a fortiori*, no other single) can beat theirs with a sidecar in the sort of test that is compounded of a hot twenty mile scrap on the level, terminating in a climb up a really steep hill, such as Sunrising. Are we to take it that an obsolescent light car is really faster than *any* sidecar outfit when touring in a hurry? One of our occasional contributors upheld the exact opposite of this view, but the sidecar and the light

car used on the above run were in approximately similar condition, and beyond question the light car was master of the situation. Moreover, genuinely up-to-date light cars can knock spots off the car in question.

### Cooling the Oil.

**B**Y all means cool the inside of the engine, as "Chinook" and others suggest, but it is far easier and quite as fruitful of results to cool the oil; and to spend a lot of trouble cooling the engine when we neglect even the crudest method of restricting the oil temperature reminds me of the man who always ate an ice immediately after his curry. In racing cars and aero engines the oil is conducted clean out of the engine immediately after completing the circuit; it is then passed through a cooling tank or radiator, and finally circulates through the engine again. A system roughly resembling this has already been tried out on a motor cycle engine with very satisfactory results, and it has only not been applied to one or two of the famous makes because of the alleged disorganisation and reduction of output which follows upon any profound change in patterns. After the war every motor cycle factory which has not been busy producing D.R. machines will have to start *de novo*; and if one or two of them have the sense and the pluck to tackle lubrication whole-heartedly, we shall all learn what gross wastage of lubricant has been the rule in the motor cycle world for years past. Internal cooling of the engine, plus external cooling of the oil, might effect a 50% reduction in one of the less pardonable extravagances of motor cycling.

### Eight in Council.

**E**IGHT of us, all hard riders, sat in symposium the other night, and, oddly enough, fell to discussing the very topic which "The Critics" selected the same week, viz., the best solo mount. At the outset the issue was confused between actual and ideal machines, and the chairman cleared the air by suggesting that until nightcaps appeared we should limit our wordy warfare to existing machines, and that the strafe would conclude with the speculative. I confess we were all riders of the same type, so our final unanimity is not so surprising as we thought it at the time. For a choice limited to one machine intended for sustained hard work we all voted for the multi-speed 500 c.c. single-cylinder; yea, even "Ixion," who shyly confessed that his pet flat twins must have lower efficiency or better plugs before he trusted them for a gruelling six days as a pressman. Nevertheless, it was obvious that the single was not a favourite with any of those present, and that each of us would give it second place if he could afford two mounts. When we turned from the real to the ideal, the dreams clustered round a 160 lb. two-speeded, spring framed flat twin, the sole dissentients being the gay bachelors, who, with thoughts of sidecars, preferred an extra gear at any price.





## K JIDO-JITENSHA JAVINT

The rider, after a fifty-six miles run in Japan, returned with battered rims, abraded crank case, and bent footrests; the author emphasises the need of spring frames Overseas.

**W**E started off merrily enough, P. S. and I, and passing through the long straggling village of Yawata, instinctively dodging the many menacing chickens, and paying no attention to the multitudinous, ill-clad, half-clad, and unclad brown children, who yelled at us to the utmost capacity of their vocal cords.

At the sharp, obscured turn in the road at the end of the village, we encountered three "niguruma" (two-wheeled, horse-drawn carts), arranged in open order so as effectually to block the whole road. The somnolent drivers were shuffling alongside their vehicles, lost, as usual, to the world, and deep in coma. Not the most frantic horn-blowing and shouting at close range on our part had the slightest effect. P.S. managed to steer a serpentine and vituperative course past them; but I took what I deemed the safer course, and pulled in close against the wall of a house just round the bend. Nevertheless, the mentally apathetic carter walked his cumbersome vehicle slantingly into me, and the carter himself got wedged between his cart and my machine.

The horse-drawn combination scored off me to the extent of one footrest doubled back and the rear wheel rim badly dented; whilst I scored three teeth, one damaged ankle, and a bruised chest, to say nothing of a torn coat, all off the carter.

The injured man seated himself by the roadside, and at the instigation of his comrades "gaped his gub," as they say in Scotland, revealing three vacancies in an array of discoloured teeth. By rights I had a claim against the carter; but he looked so woebegone that I placed two yen (about four shillings) on the road before

him as a consolation gift—it equalled at least four or five days' pay to him—and prepared to depart; but the injured man's indignant friends and sympathisers endeavoured forcibly to detain me. Seeing my predicament, P.S., wearing a ferocious expression, advanced towards my assailants, and made threatening gestures with his fists, whereat my would-be detainers allowed me to remount my motor cycle. My rear tyre looked rather unsafe on its battered rim; but I made off, followed almost immediately by P.S.

Leaving the scene of our unfortunate *contretemps*, we sped along the flat road that follows the Sagami River to Atsugi (eight miles), where I straightened my bent footrest, surrounded by a clamorous crowd, the very junior members of which faced the world and his wife *in puris naturalibus*, and with their little, brown, football-like bodies unduly distended on a purely rice diet.

### The Hinomi or Fire Bell.

Atsugi boasts a tall "hinomi," or vertical ladder, from the summit of which conflagrations amongst the tinder-box houses are located and made generally known by the ringing of a bell suspended at one side of the ladder near the top. Practically all but the very small villages possess a "hinomi," and the bells attached are of cast bronze, with intricate designs cut or cast upon their exterior surfaces.

Passing through Atsugi, we turned left through a narrow, house-lined street, crossed a reasonably sturdy bridge, and gained the open country again. For a few miles the road lay through flat, cultivated land; and, as the ricefields are arranged in small square



**A Jido-Jitensha-Jaunt.—**

patches, the road of necessity proceeds in short, straight stretches, terminating in right-angled bends. These bends made our progress slow; advisedly so, because failure to negotiate a bend meant a plunge into a flooded paddy field, and paddy fields in Japan are by no means savoury. The sandy nature of the soil calls for a fertilising agent, and this is obtained from vicinal cesspits.

Leaving the flat country and reaching the foothills that buttress the Oyama mountain range, fields of mulberry canes line the road. We were now in the silk district. Here whilst the men tend the fields the women busy themselves at home with the silk. The cocoons are immersed in hot water, and the loosened silk is wound by hand on to wooden bobbins. From the bobbins it is spun on antiquated wooden reels, hand operated. The weaving, too, is done by hand. Young girls can be seen in the cottages in the silk districts treading clumsy wooden looms, and working from daybreak to sunset.

A small "sampan" (flat-bottomed boat) carried us across the River Doshi, whilst we cooled down after the operation of lifting our heavy mounts over the boat's side, but the ferry approach on the further side bade fair quickly to restore us to a heated condition. Precipitously steep, strewn with large stones, and with but a few yards of deep sand at its base, it filled P.S. with consternation, for his machine had a foot-operated clutch. However, with the assistance of the ferryman and several willing youngsters, the motor cycle was pushed up the slope.

Getting away from Yoshino (twenty-eight miles, altitude 656 feet), we jogged merrily along the winding road that runs on the left bank of the Sagami River, often as high as 200 feet above the water, with a sheer drop.

The road surface was reasonably good, except for occasional stretches of deep mud or knobby boulders, half sunken in the soft earth. The pity is that one cannot really enjoy the superb scenery from the saddle, because the road requires one's almost constant attention. However, a brief halt at times and a contemplative pipe of tobacco helped to make this trip more of a holiday and less like a reliability test.

It was dusk when we turned to the left at Otsuki (forty-seven miles, altitude 1,180 feet), and followed the two-foot-gauge horse-tram back to Yoshida (sixty-three miles), where we arrived at nightfall, much to the delight of the ubiquitous crowd of excited youngsters, who, as soon as they spied us, screamed

to their comrades that cry that brings youngsters flocking from all parts—"Jido-jitensha." Jido-jitensha means motor cycle, and is a compound word from Jidosha, motor car (lit. self-working vehicle), and Jitensha, pedal bicycle (lit. self-rolling vehicle).

**A Japanese Bed.**

I suppose very few readers of this narrative have ever slept in a provincial Japanese hotel. My advice to those who have not yet done so is, when the time comes, to be, like the Boy Scouts, prepared. A good cure for the chronic grumblers whom one often meets in English inns and hotels would be a course of nights in Japanese "Yadodas" (hotels). The bed is but a thin mattress, barely 5ft. 6in. long, laid upon the hard floor matting. The soldier's couch upon Mother Earth has the advantage over a Japanese bed in that in the former one can dig holes to accommodate the bony protuberances, but the Japanese mat floor is unimpressed by even the most hard and angular would-be sleeper. A single padded quilt, provided with sleeves, forms the covering; and the pillow is a sawdust-stuffed cylinder about five inches diameter.

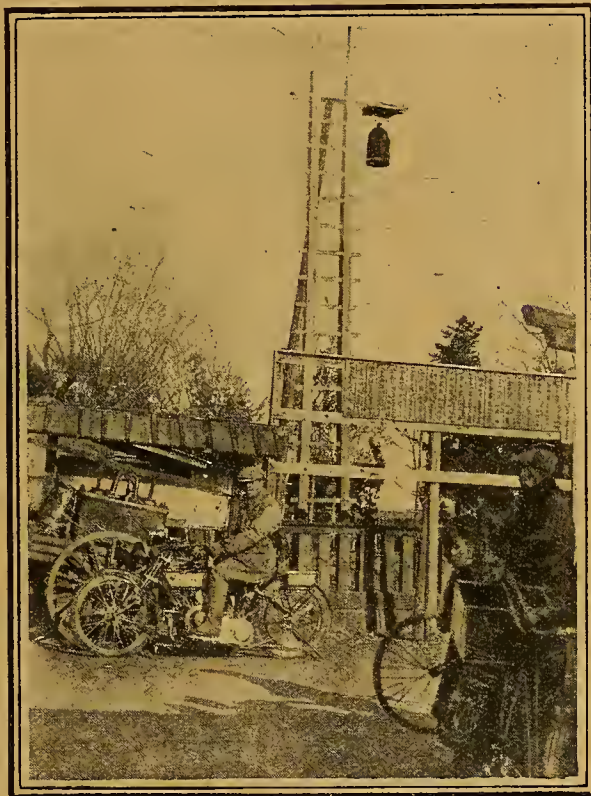
Of course, to the average European the bed is far too short, so that, whilst his feet protrude from one end; his shoulders span the gap from the edge of the mattress to the pillow, which slides gently but consistently away on the polished floor matting.

Yoshida stands at the foot of Fuji-yama, Japan's highest and most holy mountain, whose summit is 12,365 feet above the sea level. Yoshida itself stands at an altitude of 2,780 feet.

Our plan for the day was to follow the narrow tramway track that runs south along Fuji's base to Gotemba (nineteen miles), and turn east over the Hakone mountains and back to our headquarters.

We soon struck trouble. The road (?) was inches deep with loose volcanic ash, and was studded with large, partly-embedded boulders. Over these we slid and bumped for a while, but the sound of crank case against rock proved so nerve-destroying that we tried riding between the tram rails. Oh! why do not British manufacturers give us motor cycles with a reasonable ground clearance?

We hardly appreciated the scenery whilst riding, so engrossed were we in maintaining the perpendicular; but during our brief halts we were able thoroughly to enjoy the view. On our right Mount Fuji rose clear away in a sweeping curve from his forested base to his snowy summit, with the volcanic ash showing dull red on the



A Hinomi, from which fires are located.



**A Jido-Jitensha Jaunt.—**

intervening belt. On our left the ground sloped away to the narrow plain, bounded in the distance by the Hakone mountain range.

The road rose steadily to Yamanaka Lake (six miles from Yoshida, and 3,280 feet above the sea), whence a steep, winding ascent of three miles brings the traveller to the summit of the Kagosaka Pass, 3660 feet above sea level. At the foot of this ascent, whilst negotiating a particularly bad series of half-buried boulders, the bolt of my saddle clip sheared off, allowing the whole saddle to come adrift. With some stout cord I lashed the saddle firmly to the rear carrier, making a secure but practically springless seat. Remounting, I plugged away up the pass, jolting most painfully from obstacle to obstacle, and soon reached the summit, whence I could see the road winding steeply down towards the village of Subashiri.

A short stretch of tolerably good road through the village came as a welcome change, but we were soon amongst the boulders and ash again. About four miles from Subashiri the tramway leaves the road and takes a more or less evenly falling path of its own into Gotemba.

We felt very tired and sore, and whilst partaking of light refreshment in an inn we discussed the desirability of taking train from the railway station at Gotemba to our headquarters. But the thought of the new military road that winds up over the Hakone mountain range in easy sweeps decided us. We plumped for the road—not the rail. Having purchased some dubious-looking petrol, sold in beer bottles, we were soon purring merrily up the Nagao Pass.

**On the New Military Road.**

Gotemba's altitude is 1,485 feet, and that of the summit of the Nagao Pass is 3,100 feet. The 1,615

foot climb is accomplished in six miles, i.e., the average grade is approximately 1 in 19. Not a very stiff average grade, but there are certain portions of the pass that are quite steep.

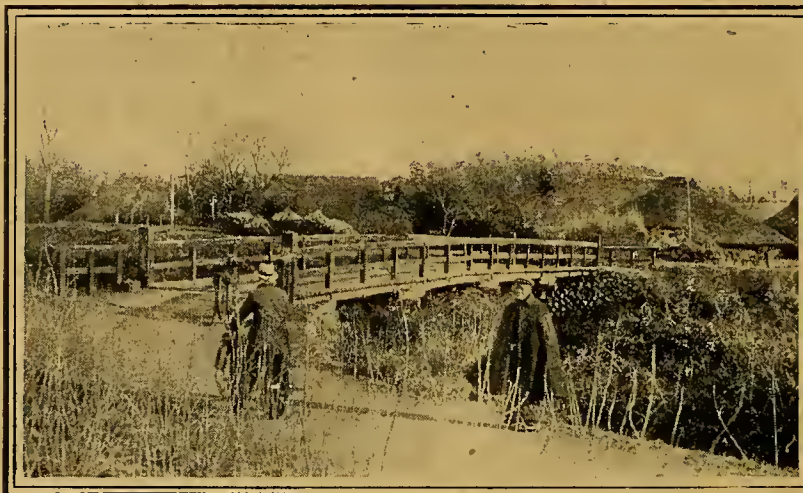
The view from the summit is superb. Mount Fuji rises grandly from the plain with nothing to obstruct the view from base to summit. The small rice fields give the plain a patchwork appearance which is accentuated by the brown roofs of the tiny villages of thatched cottages, and the clumps of dark green pines.

Passing through the tunnel at the summit of the pass, another grand view meets the eye—a view of a more variegated character. Fuji dominates the view

on the western side, but on the eastern side of the tunnel the view is one of many jumbled, lesser mountains, deep valleys, glittering, thread-like streams, and the Hakone Lake ringed in by verdure-clad hills.

After a brief pause to enjoy the landscape, we sped away noiselessly down the winding pass with clutches out. On the one hand the wall of the mountain side,

and on the other a drop of many feet into the cosy valley. Amongst the foothills the country becomes more open, and the sea level is reached at Odawara, four and a half miles from Yumoto. Speeding over the flat Tokaido, Japan's main thoroughfare, we were soon into the busy town of Kodzu; out again, along the sea coast for a while, and then a mild speed burst of ten miles brought us back to our headquarters, tired but content. True we had but 56½ miles to our credit, but in Japan it is the quality of the road that tells rather than the quantity. Our motor cycles had sustained battered rims, abraded crank cases and bent footrests, thus emphasising the plea for high ground clearances and heavy tyres, greater in sectional diameter than the width of the rims on which they sit; and our aching backs proved most conclusively to us that spring frames are essential. E. STEVENS.



Wooden bridge on a Japanese road

**CLEAN HANDLE-BARS.**

I AM all in sympathy with the recent editorial on relieving our handle-bars of some of the hamper which at present clutters them up. The Indian people set a good example in removing the speedometer dial therefrom: its weight and the pull of its cable exert a bad effect on the steering; there are plenty of well-balanced machines which can be ridden hands off at a good speed until a speedometer is fitted; after that they require holding. A bulky hooter looks abominable, and imparts a lopsided appearance to the machine; but hand-operated hooters cannot well be

mounted elsewhere; we must wait till we get reliable electric or exhaust alarms, controlled by a handle-bar push and connecting cable. The air lever will soon become sufficiently otiose to be fixed elsewhere; the ignition lever might already be shifted, as a trifle of retard on infrequent occasions is all it really wants. Some day we shall see the fittings on the standard bar reduced to throttle, front brake, and exhaust valve levers, with a switch or other control for the alarm apparatus. When that day comes, our machines will be far easier to keep smart. IXTON.





# ARIEL SERVICE.

## OWNERS' OBSERVATIONS.

“For ACCESSIBILITY, POWER, SPEED, ECONOMY, GENERAL EFFICIENCY, RELIABILITY, AND FLEXIBILITY IT WILL BE HARD TO BEAT,”

says T. M., Durham, after twelve months' experience of the Ariel.

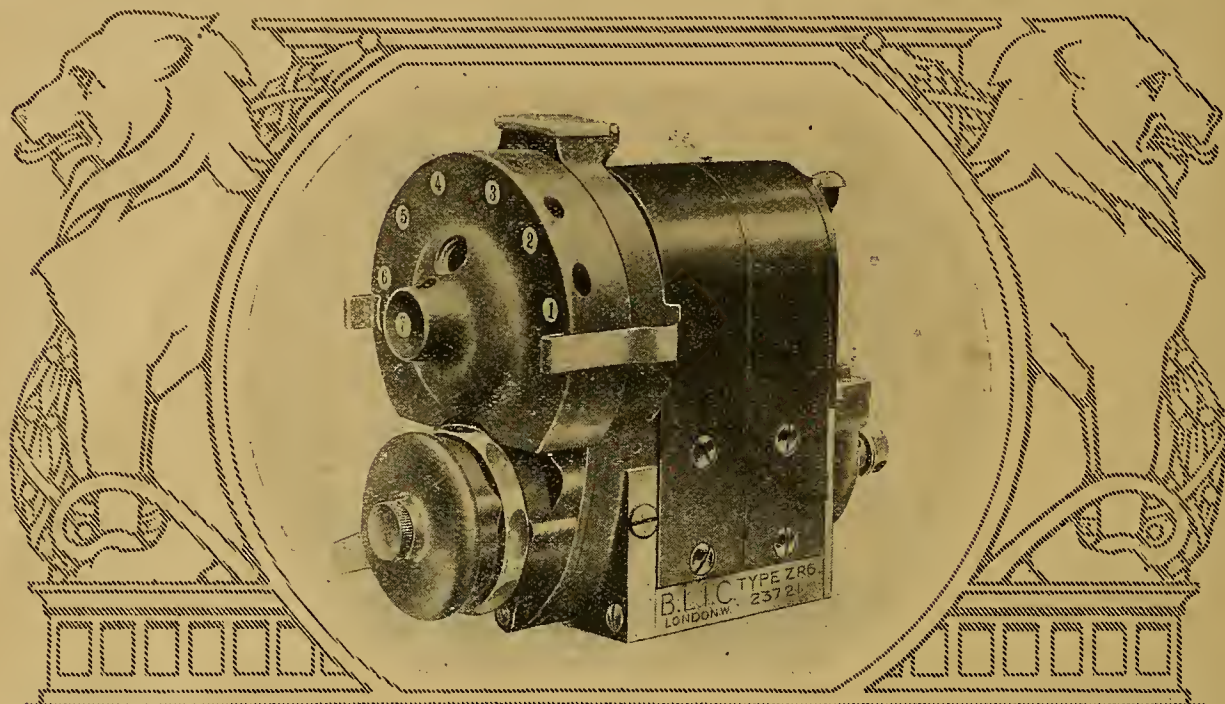
ART LIST POST FREE.

ARIEL WORKS, Ltd., 3, Bournbrook, BIRMINGHAM



*In answering this advertisement it is desirable to mention "The Motor Cycle."*





**British – and Best!**

**B.L.I.C.**

THE BRITISH LIGHTING & IGNITION CO. LTD.

Built in a British Factory by British workmen, with a unique experience of magneto manufacture, the "B.L.I.C." embodies every scientific principle in design and manufacture. It is the most reliable magneto yet produced—British or foreign.

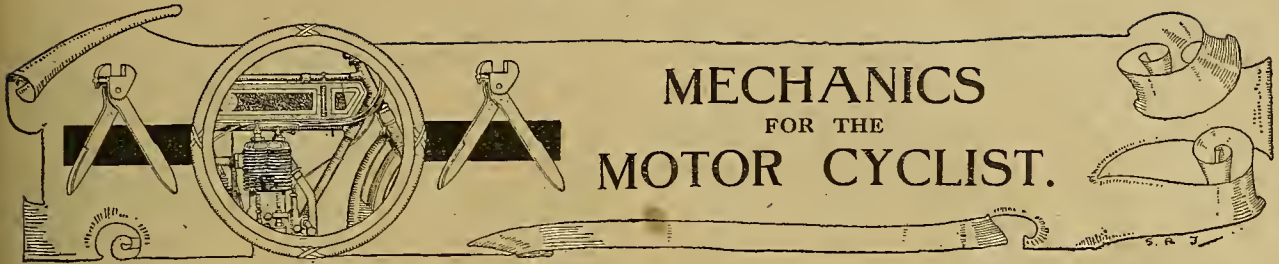
At present our works are entirely engaged in meeting the requirements of the British and Allied Governments. We trust, however, you will specify the "B.L.I.C." Magneto for your post-war requirements.

The BRITISH LIGHTING & IGNITION Co., Ltd.  
(Proprietors: VICKERS, LIMITED),  
204, TOTTENHAM COURT ROAD, LONDON, W.1.



*In answering this advertisement it is desirable to mention "The Motor Cycle."*





## MECHANICS FOR THE MOTOR CYCLIST.

### Fifth Instalment: WORK AND ENERGY.

Previous instalments appeared on July 19th, August 9th, August 23rd, and September 20th.

It is hardly necessary to point out to thinking motor cyclists the great desirability of a little mathematical knowledge—so many questions may crop up, as, for instance, the horse power required to mount a certain hill, the tension of a belt or chain when driving a heavy machine, or the calculation of a gear, that the man who is entirely ignorant of these matters must often be at a loss. In this and the following articles (of which there will be several) the author proposes to discuss some of the simpler problems dealing with speed, acceleration, force, inertia, centrifugal force, etc., and their practical application to everyday questions in a popular manner without unnecessary technicalities. No motor cyclist, therefore, need pass by these articles under the impression that they are beyond his understanding, for everything is explained in simple language.

**WORK.**—Most of us nowadays have a painfully clear conception of the meaning of work, and we shall therefore not be disposed to quarrel with the statement, to be found in text-books on mechanics, that "Work is done when resistance is overcome through a distance." If a rigid body is subjected to a force no work is done, irrespective of the magnitude of the force, *so long as the body remains stationary*, but as soon as the resistance to motion is overcome and the body begins to move then we say that work is being performed. A man trying to raise a weight may tug as hard as he likes, but he does no work unless he actually overcomes the resistance of gravity and lifts the weight through a distance. In all cases work is measured by multiplying the resistance overcome by the distance through which it is overcome. For instance, when a weight of 50 lbs. is raised 4ft. we say that  $50 \times 4 = 200$  foot-pounds of work have been done. Observe that the element of time does not enter into the problem at all; it is immaterial whether the operation takes two seconds or twenty-four hours as far as the quantity of work done is concerned.

#### Two Kinds of Energy.

**Energy.**—In technical language, energy is defined as "capacity for doing work"—a definition which corresponds pretty closely with the usual meaning of the term. A body may possess either *potential energy*—that is, energy by virtue of its position—or *kinetic energy*, which it possesses by virtue of its motion. The body may also have both kinds of energy simultaneously.

**Potential Energy.**—As we have just seen, a weight can only be lifted from the ground by doing work on it. Now this work is not wasted; it remains stored in the weight in the form of potential energy, for the body can do just as much work in descending to its original position as was done on it in raising it. A grandfather clock supplies a simple illustration of this form of potential energy. At the end of the week a certain amount of work is expended in winding up the weight, whereby it acquires a store of potential energy. At any rate, the weight has demonstrably acquired a capacity for doing work, for during the whole of the ensuing week it overcomes the resistance

of the moving parts of the clock. Waterfalls may be regarded as natural sources of potential energy. Until the engineer comes along the whole of the energy possessed by the water at the top of the fall in virtue of its height above the fall is dissipated, but the installation of a water turbine renders a considerable proportion of this energy available for doing useful work. The energy of a body is naturally measured by the quantity of work it can perform. Thus, the potential energy of an object weighing 50 lbs. at a height above the ground of 4ft. would be 200 ft.-lbs.

#### Storing Potential Energy.

There are other means of storing potential energy besides that discussed above. Every time you wind your watch up you endow the spring with a sufficient supply of energy to enable it to keep the watch going for the next twenty-four hours. Compressed air forms an extremely convenient medium for the storage of potential energy. This fact is grimly brought home by the knowledge that the torpedoes that rob us of our breakfasts are propelled by compressed air energy.

**Kinetic Energy.**—All bodies in motion possess the capacity for doing work. This statement follows logically on the conclusions we came to concerning the relations between force and acceleration. To bring a moving body to rest, it was shown that force must be applied to it; but since, during the process of retardation, the body manifestly travels through an appreciable distance we can say that a resistance has been overcome through a distance, *i.e.*, work has been done, which proves that the moving body was endowed with energy.

#### Storing Kinetic Energy.

It is hardly necessary to quote many examples of the manner in which kinetic energy is utilised in doing work. We need only consider a carpenter driving nails; he uses a hammer because the rapidly moving hammer head provides a very convenient source of energy for overcoming the resistance of the nail in the wood. Kinetic energy plays a most important part in the operation of a motor cycle engine; so much so that a special component is introduced whose sole function is to act as a store of energy. This component is the flywheel. The energy developed within the cylinder by the combustion of the petrol vapour



**Mechanics for the Motor Cyclist.—**

is liberated in an extremely fluctuating manner, for in only one stroke out of four (in a four-stroke engine) is any useful work done on the piston. But nevertheless, the machine demands for its propulsion a constant supply of energy. The flywheel enables this requirement to be fulfilled. Just as Lord Rhondda's illustrious predecessor, Joseph, built granaries for storing excess corn during the fat years to ensure an adequate supply during the inevitable lean years, so the motor cycle designer provides a flywheel for storing the surplus energy generated during the "fat" explosion stroke, which is given out again during the three succeeding "lean" strokes.

The actual quantity of kinetic energy possessed by a moving body is proportional to the weight of the body, and to the square of its speed. Hence a body weighing 5 lbs., travelling at 50ft. per sec., will be capable of doing as much work as a body weighing 20 lbs., having a speed of 25ft. per sec. Expressed mathematically, we may say that

$$\text{Kinetic energy (foot-pounds)} = \frac{1}{2} \cdot \frac{WV^2}{g}$$

where  $W$ =weight of body in pounds,  $V$ =speed in feet per second, and  $g$ =acceleration due to gravity=32ft. per sec. per sec.

**Energy is Indestructible.**

**Conservation of Energy.**—One of the fundamental laws of mechanics is that energy is indestructible. Once energy has been imparted to a body, it is impossible to destroy that energy, though it is, of course,

perfectly feasible to transmit the energy to some other body, or to convert the energy into some other form. When the carpenter's hammer head comes to rest, the kinetic energy it possessed has manifestly disappeared, but although the energy no longer exists as *kinetic* energy, the work done in driving the nail has generated an equivalent amount of *heat* energy (due partly to the friction between the nail and the wood and partly to the pressure between the head of the hammer and the nail), the net loss of energy being nil.

A cyclist commencing a long coast from rest

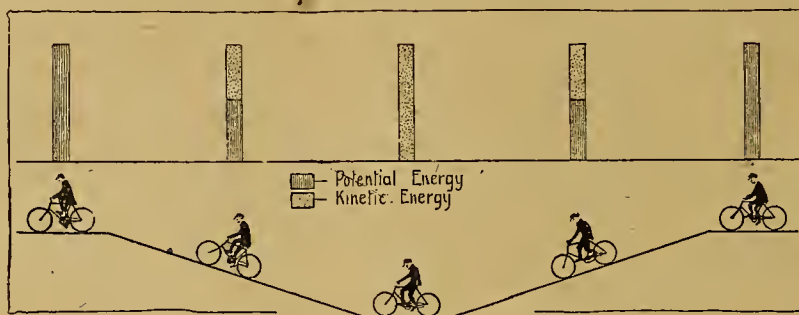


Diagram illustrating the conservation of energy.

possesses only potential energy; as his speed increases this store of energy diminishes, there being a corresponding gain in kinetic energy, while at the foot of the hill the whole of the energy has been converted into the kinetic form. In the ascent of the

opposite slope a reconversion of energy occurs; the loss in speed, and consequently in kinetic energy, is compensated for by the gain in potential energy. These changes are represented graphically in the accompanying diagram, the heights of the column denoting the appropriate amounts of energy at the various points.

It is scarcely necessary to point out that only a diagrammatic cyclist could succeed in coasting down a hill, and free-wheeling up the succeeding rise to the height from which he started; the practical rider is only too sadly aware that a large percentage of the potential energy with which he begins a descent is dissipated by frictional resistances of various kinds, and is thus transformed into useless heat energy.

MOHANDIS.



**A SCENE  
OVERSEAS IN  
PEACE TIME.**

At Van Staden's Drift, South Africa. The all-chain drive enthusiast can afford to smile at the owner of a belt-driven combination on encountering one of these numerous fords.



"The Proof of the Tyre is in the Running."

NORTH BRITISH

# CLINCHER

## Motor Cycle Tyres

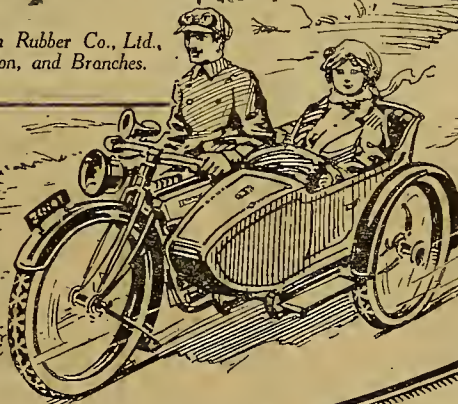
### On a Country Spin

—when mile upon mile of steady going is the first essential to enjoyment—then it is that CLINCHER quality tells.

The pure plantation rubber used in the making gives a perfect resilience, which means much to the pleasure of the run—and much to the welfare of the machine.

The sixty years' reputation of the Largest Rubber Factory in the British Empire is behind every CLINCHER Tyre.

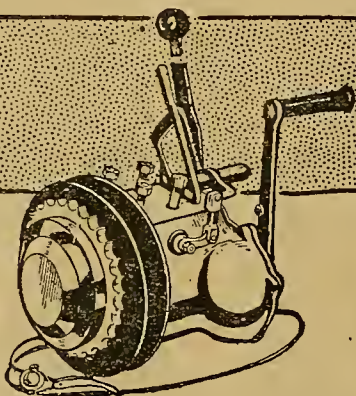
The North British Rubber Co., Ltd.,  
Edinburgh, London, and Branches.



Stockists  
Everywhere.

In answering this advertisement it is desirable to mention "The Motor Cycle."





"Somewhere in France."

When you're feeling tired and lonesome  
And you're full of mud and wet,  
And the shells are crooning moansome  
And the German sights are set.  
When you've got to take a message  
Through a land of shot and shell,  
And you don't know how you'll get there,  
Past that crashing mouth of hell.  
Then you tighten up your belt, lad,  
Think of home and mother dear,  
Shove the message in your pouch, and  
Trust to luck and to your gear.  
For you've got to suit your pace, then  
To the dropping of the shells.  
It's the sprint, and then the halt, and  
Then a hurried rush that tells.  
Your life is on your gear then,  
And you bet that all of us  
Who have got the job out here are  
Mighty careful of our "bus."  
That's why every Army rider  
Who's been half-a-week at war,  
Swears by the Sturmev-Archer,  
For we know then where we are.  
It's a gear that's tried and trusted,  
That's standing day by day,  
To help us on our long, long road,  
Our hard, victorious way.  
And when the war is over,  
And we're back again with you,  
We'll shout for Sturmev-Archer,  
The gear that saw us through!

The above impromptu from a despatch rider who has "done his bit" is but one of thousands of testimonies to the efficiency and service of the

# STURMEV ARCHER

COUNTERSHAFT GEAR

Sturmev-Archer Gears, Ltd., Nottingham.



**Bowden Wire Ltd.**  
London

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

Victoria Road, Willesden Junction, N.W.10.  
Established 1897.

PLAYER'S

# COUNTRY LIFE

Cigarettes

(MEDIUM STRENGTH)

Pure Virginia Tobacco

10 for 4<sup>d</sup> 50 for 1/7<sup>1d</sup>/<sub>2</sub>

These Cigarettes are also supplied at Duty Free rates for the purpose of gratuitous distribution to wounded Soldiers and Sailors in Hospital.

Terms and particulars on application to:

**JOHN PLAYER & SONS, Nottingham.**

Branch of the Imperial Tobacco Co. (of Great Britain and Ireland), Ltd.



# THE Critic

Fireside Chats on  
Motor Cycle Problems

## A SPORTING CHALLENGE.

"DID you see in *The Motor Cycle* of last week," queried the Novice, "that some ambitious 4 h.p. single-cylinder advocate has offered to take on a 6 h.p. or 8 h.p. twin over a given route ending in a test hill, the challenge being, apparently, that the single will beat the twin up a test hill on time after an initial warming up of twenty miles or so, both machines to be fitted with sidecars? Gad, if I still had my A.J.S. or Matchless, I wouldn't mind taking them on myself."

"Yes," said the Manufacturer, "and you'd be beaten to a frazzle!"

The Novice regarded him defiantly. "What, do you mean to say a 3½ h.p. or 4 h.p. could beat a 6 h.p. for speed on a hill-climb?" he demanded, a shade indignantly. "Especially if the test is preceded by a blind? Why, man, it stands to commonsense that the big machine would arrive at the battle-ground cool as a cucumber, while the overloaded single would knock itself to a standstill on the first gradient."

"I don't know about knocking itself to a standstill," modified the Journalist. "Present-day singles don't do that sort of thing. I have no doubt whatever that the twin would lose more of its power during the preliminary blind than the single, but, of course, it could afford to do so. Big twins are very apt to flag on gradients after running hard, owing to the inadequate cooling of the rear cylinder, whereas some present-day singles seem to like it."

The D.R. so far had been thoughtful. "I wouldn't mind having a £5 note on the twin if I could pick my own mount," he now asserted.

"Perhaps you'd also like to pick your own test hill?" suggested the Manufacturer.

"Well," replied the D.R., "given that privilege into the bargain, I wouldn't mind planking £20 on the twin."

### Gear Ratios.

"Seems to me," put in the Journalist, "that there are a good many deciding factors to be taken into account. I have no doubt one could select a hill on which the normal advantages of the big engine would be lost. Suppose it was one of those tantalising hills, for instance, which are neither top gear nor middle gear hills, but which flag on interminably. Both machines would have to change down early, and then, both being on top of their work, it would be purely a matter of revs. On the middle gear hill the single would stand a thumping good chance, but if

the gradient moderated a little, enabling the twin to get on its top while the single still had to hang to middle—or even if it became steeper, so that the single had to swoop down to low while the twin clung to middle—then the big engine would score."

"There," said the Manufacturer, "you are discussing the important point of gear ratios, which pretty well decides the whole problem. What you infer is that, if both machines were provided with Gradua gears, giving an infinitely variable range, the twin would win?"

"Undoubtedly it would," agreed everyone.

"That, again, depends upon circumstances," asserted the Manufacturer. "I have recollection of a wee 2½ h.p. A.J.S. with sidecar beating more than one hulking great American twin on timed climbing tests. At the present time my firm are making an 8 h.p. twin—an excellent and powerful mount in every way. We are also making a 2½ h.p. single, and I will go so far as to say that you can have the best twin we ever sold to the public and I'll beat you on any reasonable test hill you like to name on one of our 2½ h.p. singles."

"Both machines to have sidecars?" queried the D.R.

"Certainly."

"But what sort of a skeleton affair do you attach to the single?" the Novice demanded.

"Both machines to be fitted with touring sidecars in keeping with their design, and both carrying 20 stone of passengers."

"Sounds a bit tall!" observed the D.R.

"Perhaps so," the Manufacturer permitted. "But there is no vain boast about it—both machines coming from our own factory."

"Then," demanded the Novice, "why in Jupiter do you make the huge twin when you admit the little machine can be made to do as much and more? Why do you dupe the public into spending £110 when you could offer them something as capable at half the price? That's what I'd like to know."

### The Specially Tuned Mount.

"There are a score of reasons," snorted the Manufacturer, "which anyone with the intelligence of a midge would perceive for themselves. But to back my assertion still further—you can take a Singer or a Calcott, or any similar well-made light car you like, and knock spots off a Rolls-Royce under certain conditions. Those conditions are that the light car has a factory behind it, that it

chooses its own gradient—freak bends barred—and that the R.R. is in the hands of a private owner."

"Now how on earth are you going to do these wonderful things?" asked the Novice a shade wearily.

"Workshop tuning is the first thing," asserted the Manufacturer, who was not out to present gratis any trade secrets—if such things exist. "And the second thing is correct gear ratios. To return to the 2½ h.p. versus the 8 h.p. Now after a day or so on the selected test hill we should know exactly the best gear for the little machine, and on reaching the climb we should change early and simply shoot up like wet soap—the engine 'revving' about twice the speed of the opponent 6 h.p. I tell you, the latter simply wouldn't get a look in!"

"That sounds very convincing," admitted the D.R. "But supposing the big twin also took it into its head to 'rev.' on a slightly higher gear? You'd be in the soup then, wouldn't you?"

"No, because the twin we sell to the public would not be able to 'rev.' to anything like the same extent as the little engine we had tuned to beat it."

"Suppose you tuned the twin also?" suggested the Novice.

"Ah, then —!" said the Manufacturer, with a gesture of his hands. "It would be a different matter, or course."

### Speed or Reliability.

"What you stipulate amounts to this," said the D.R. "That the big machine be an ordinary touring twin, and driven by an ordinary, everyday motorist, while the little one is specially tuned and geared for the contest, and has every advantage of a workshop and skilled testers behind it, which the other has not. That, of course, puts rather a different complexion on things, but even then I am afraid you would be beaten."

"What I'd like to know," stated the Novice, "is this. If the Manufacturer can do such wonderful things with his little engines, why the dickens doesn't he do them and let the public have the benefit? Why doesn't he clear the boards?"

"Because," replied the Manufacturer, "we do not go in for producing speed mounts. Some firms market special hot stuff models, and sell them as such. We aim at absolute reliability and freedom from the necessity for adjustment. We have made small engines which will do the things I claim, but in the hands of the everyday rider they would be an absolute failure unless sold purely as sports models."



# Current Chat

## TIMES TO LIGHT LAMPS.

### GREENWICH TIME.

Oct.	4th	...	...	6.2	p.m.
"	6th	...	...	5.57	"
"	8th	...	...	5.52	"
"	10th	...	...	5.47	"

## Gas Company and Petrol.

The South Suburban Gas Co. are still employing liquid fuel only on their large fleet of motor vehicles, including side-carriers.

## Methylated Spirit as an Engine Starter.

A Charterhouse correspondent informs us that he is running his motor bicycle satisfactorily on paraffin, and obtains an easy start by injecting methylated spirit into the cylinder. He has no petrol.

## Straying Horses.

A correspondent desires to call the attention of motor cyclists crossing Mitcham Common at night to the stray horses which occasionally cross from the Common on to the tramlines between Mitcham and Croydon.

## Pioneer Motor Cyclist in France.

R. Boxer, a pioneer South London motor cyclist, who was formerly associated with G. Barnes in the earlier motor cycle manufacture and racing, is now serving in the R.F.C. in France as a lorry driver. He was until joining employed by the Bat Co.

## Petrol Waste.

Scene: The harbour of a South Coast town. A seaplane has come to grief when alighting, and is being dismantled on the quay. A group of R.N.A.S. mechanics gather round the tail of a lorry, preparatory to "knocking off" for dinner. A can of petrol is opened, and the priceless fluid poured into a large sponge, which is passed, dripping, from man to man, for the purpose of washing the hands and arms.

An officer turns to them: "Say, what's that you're using?" "No. 2, sir!" "Oh, all right, but don't touch the No. 1." "Aye, aye, sir."

This incident was witnessed recently by a member of our staff, who estimates that the sponge contained sufficient "juice" to run his motor cycle ten miles.

## SPECIAL FEATURES.

### A JIDO-JITENSHA JAUNT.

### MECHANICS FOR THE MOTOR CYCLIST. THE 1918 INDIANS.

## American Abbreviations.

Our Yankee cousins call petrol gasoline for short. Why? They are always out to save time, but we know which word we can say the more quickly.

## Starting on Coal Gas.

A Blackheath motorist who is running a new Matchless outfit on paraffin has solved the starting difficulty at home by simply connecting up a household gas tap to the induction pipe.

## A Trade Change.

Over premises in the Old Kent Road is to be seen the notice, "Motor and Cycle Depot," yet the window display is entirely devoted to second-hand clothing! The former proprietor is in the Army. Perhaps his wife is carrying on.

## An R.N.A.S. Smoking Concert.

At Oddenino's Restaurant a smoking concert was held by the M.T. Repair Department of the R.N.A.S., Wormwood Scrubbs, on Wednesday, September 19th. News of the concert was sent to us by that well-known pre-war rider, Lt. H. C. Mills, R.N.V.R., the Officer-in-Charge of the Repair Department. The concert was a great success, and numerous well-known artistes took part. The principal performers were Bransby Williams, Madame Ada Crossley, Max Darewski, and Marie Lloyd.

## Motor Cycle Police.

It seems strange that the police of this country do not make more use of the motor bicycle. Over the water our American Allies employ policemen motor cyclists to a great extent. They use them to catch those who exceed the speed limit, and it is certainly more gratifying to be caught by a fellow motor cyclist who rides up to you at a speed exceeding your own, and who also breaks the law himself in catching you, than to be stopped by an English policeman whose colleagues hide when and how they can, and time you over the all too short 220 yards.

The police in Vallejo, California, use a Harley-Davidson, and have travelled 3,883 miles on it in the first year, having responded to 784 calls. The police car travelled 1,655 miles in the same period, and answered 427 calls. Each policeman on a motor cycle was accounted to be equal to a dozen men on foot. The upkeep of the motor cycle cost eighty cents more than the car.

## THE MODERN BREAKDOWN GANG

The garage of Mr. Fred Mitchell, of Saxmundham, like all others, has sent men to serve their country. Two local girls have offered their assistance and go to work on a motor cycle one riding on the carrier. When a breakdown occurs in the locality, these two girls set off on their motor cycle, on which is carried "First aid" appliances.





**American Red Cross Motor Cycles.**

The American Army is already using motor cycle ambulances in France, and it seems likely that their numbers will be increased.

**Avoid Highways.**

A gifted dreamer, not a present-day practical motor cyclist, pointed out and proved in well-chosen language that the straight road is not always the easiest.

**A Gallant Motor Cyclist.**

On another page we describe a dinner given by the Sutton Coldfield Club in honour to Capt. J. W. Woodhouse, whose conspicuous bravery as an air pilot has earned for him the D.S.O., to which, at a later date, a bar was added, and also the Military Cross.

Jack Woodhouse joined up in the second week of the war, and fought with the infantry through the big retreat, returning to England and obtaining his commission in the R.F.C. in 1915.

**The Work of the Tester.**

The majority of our readers probably regard the Triumph tester as being the acme of perfection as regards the art of tuning and fine adjustment. So, in all probability, he is, but it will doubtless come as a surprise to many to know that the Triumph testers are not allowed to make any alteration or adjustment whatever to a machine during the period that it is on road test. All they can do is to return to the works and make a full statement as to what is required to be done. In this manner a complete record is kept as to the adjustment of each machine when it leaves the factory, whereas if the testers were permitted to make what alterations they chose, each man would tune the mounts he handled to his particular tastes, and the firm would have no perfect and complete record of the final adjustments.

**The Motor Cycle and the Mere Man.**

Miss Joan Stanton, who writes an interesting article in last Friday's *Evening News*, entitled "The Whole Art of Managing Husbands," if not a motor cyclist herself is distinctly sympathetic towards the movement. "No one with any sense," she says, "would set out habitually to run a motor cycle with only the knowledge that certain handles would produce certain effects; if they did, it is easy to imagine what difficulties would arise, and how impossible it would be for the novice to deal with breakdowns when they occurred. Yet women marry every day with only the rudimentary ideas of the working of the mind of man." Further on she again uses a motor cycle story to force her meaning home. "There was once a man who kept bees, and made his own bee hives; also he had a motor cycle, which he often took to pieces. Said the maid in that household one day: 'If master didn't keep bees and didn't have a motor cycle it would be easier to keep the flat clean—but then, you know, m'm, he might drink.' It was a bit of philosophy that helped one wife to realise that many vices have corresponding virtues; it is such hits of philosophy that should be offered to students taking the 'Study of Man' course." Two excellent illustrations, we venture to think.

**Motor Cycle Thefts.**

Motor cycle thefts appear to be almost as frequent in the United States as they have been recently in this country. A recent issue of an American motor cycle paper contains four paragraphs relating to stolen motor cycles.

**The Institution of Automobile Engineers.**

The first meeting of the session of the Institution of Automobile Engineers will be held on Wednesday, 10th October, 1917, at the Royal Society of Arts, John Street, Adelphi, W.C., at 8 p.m., when Lt.-Col. R. K. Bagnall-Wild will deliver his presidential address.

Cards of invitation to the meeting may be obtained on application to the Secretary of the Institution, 28, Victoria Street, S.W.1.

**The Tribunal and the Motor Cyclist.**

A motor cycle agent, who was granted exemption by the Shoreditch Tribunal, asked the chairman if he could do any good for the Tribunal with a motor cycle and sidecar.

"You cannot," said Mr. Harwood, the chairman, "unless you like to take us out for a trip on Sundays." (Laughter).

The Applicant: "I shall be only too pleased."

Mr. Harwood: "We'll let you know." (More laughter).

**The Motor Cycle as a Fire Engine.**

Far away in distant California an American motor cyclist, rejoicing in the good old Anglo-Saxon name of Smith, riding a Henderson and sidecar, saw the hay and corn fields of a farmer acquaintance on fire. Fortunately the fire had made little headway. Smith immediately made for the nearest farmhouse and procured two ten-gallon milk cans. These he filled at the nearest horse-trough and set forth full tilt over the stubble and through the tall corn to the fire. After three journeys he subdued the fire and saved 250 acres.

**The National War Funds.**

At the week-end the principal war relief funds stood as follow:

The National Relief Fund (distributed £3,657,622) .. ..	£6,232,815	0	0
British Red Cross Fund .. ..	7,305,338	7	8
Queen's Work for Women Fund .. ..	173,237	14	9
Tobacco Fund .. ..	137,743	0	0

**A 1918 Model.**

In this issue we describe the first of the 1918 models—the production of the Hendee works. One or two of the alterations that have been made in the Indian models are distinctly interesting, as, for instance, the employment of wire controls.

**A Japanese Motor Cycle Club.**

A motor cycle club has been formed in Tokio by the local agents for the Indian motor cycle. It celebrated its first run the other day, from Tokio to Hakone, a distance of sixty miles. The destination is a pretty place famous for its scenery and hot baths.

**Another Motor Cycle Theft.**

An exciting incident happened at Bagshot the other day. A man arrested on a charge of stealing a motor cycle at Aldershot struck the police while being handcuffed on his way to the police station. He jumped over the parapet of a bridge into the water twelve feet below, and disappeared in the darkness.

**A Sidecar Tip.**

There is always a slight pull to the left in the steering of a sidecar outfit, owing to the weight of the sidecar and the camber of the road, and the comfort of the rider is very much increased if the bars be adjusted so that the left grip is nearer to him than the right with the wheel straight. This compensates the slight incline of the wheel to the right when the machine is on the road, and it will be found that, with the bars adjusted thus, they are normally straight when travelling.



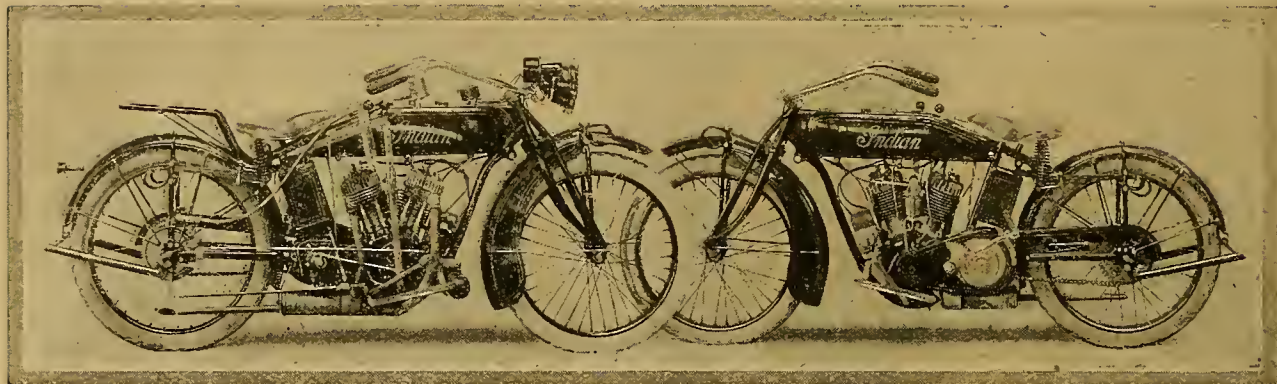
ON THE SHORE OF AN AMERICAN LAKE.

The owners of the outfit have fitted a trailer to their motor cycle on which they take home their boat after fishing expeditions on the lake.



# THE 1918 INDIANS.

FOUR MODELS; DETAIL REFINEMENTS; IMPROVED SPRINGING.



Valve side of the NE-18 model. It is fitted with a 7-9 h.p. Powerplus engine and dynamo lighting.

Transmission side of the N-18 model. Note the absence of rod controls and the employment of wires.

VERY few radical alterations have been made in the Indian models for 1918. It was considered that last year's models could hardly be improved upon for the time being, and what alterations have been made are more in the way of general refinements, which add to the comfort of the rider and general reliability of the machines.

Four models are to be produced, three of which will be fitted with Powerplus engines, while the fourth is a flat twin model, already familiar to our readers. The models are:

Type N-18, three-speed Powerplus twin, bore and stroke 79.375 mm. x 100.806 mm., 997.64 c.c.

Type NE-18, a similar model, but electrically equipped.

Type O-18, a light twin, with horizontally-opposed engine, 50.8 mm. x 63.5 mm., 257.4 c.c., having three speeds.

Type W-18, a single-cylinder Powerplus model, with three speeds, a type intended exclusively for commercial work.

With the big V twin models the chief refinements are as follow: A larger scroll

is provided for the front fork springs, which are of somewhat different profile, while the tubes are circular instead of D-shaped, as hitherto. This is claimed to give greater strength in resisting the side strains that are imposed by the pull of a heavy sidecar. The standard handle-bars, which are of slightly different design, are attached forward of the steering column, and it is distinctly interesting to observe that the usual rod controls have been abandoned, and that wire controls now work in conjunction with the twist grips.

## The Exhaust Valve Lifter.

Another interesting point is the provision made for the exhaust valve lifter. Hitherto it has been operated by the right-hand twist grip, which controls also the magneto timing. In order, therefore, to attain the point at which the valves were lifted, one was compelled to pass over the fully retarded position of the magneto, which had a tendency to cause difficult starting.

By the present arrangement, the spark can be set in the desired position and the engine turned by the kick starter, with the valves lifted, so that, in cold weather, an easy start can be made. This, of course, is in accordance with the usual British practice, except that the lever is situated on the right side of the tank.

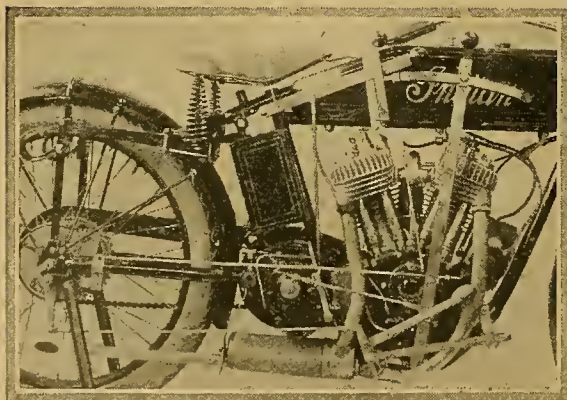
Another alteration is in the control of the external contracting rear wheel brake. As hitherto, the foot lever operates the internal expanding rear brake, but whereas the external contracting brake working on the same drum was previously operated by a handle-bar lever, it is now controlled entirely by the long vertical clutch lever. When this lever is

thrust forward, its first motion disengages the clutch, and its second action applies the brake, so that by this means the machine can be held on a gradient, the brake notched in position. This is particularly convenient for sidecar use. Both brakes have been increased in width, while the silencer has been enlarged and a double cut-out fitted.

## The Improvements.

Reviewing these refinements, it is claimed that the increased size of the scroll in the front forks results in greater flexibility and longer life. The rebound is better controlled than formerly, and the machine is very much easier to handle on bad surfaces at high speeds.

The wire controls that take the place of the rod controls with their universal joints and bell crank connections not only reduce the number of small fittings, but are more positive in operation. The right-hand grip operates the throttle, and the left-hand controls the contact breaker, and though the somewhat original position of the exhaust



A close view of the power unit. The tank controls are gear and clutch levers (the latter controlling also the external contracting brake) and exhaust valve lever.



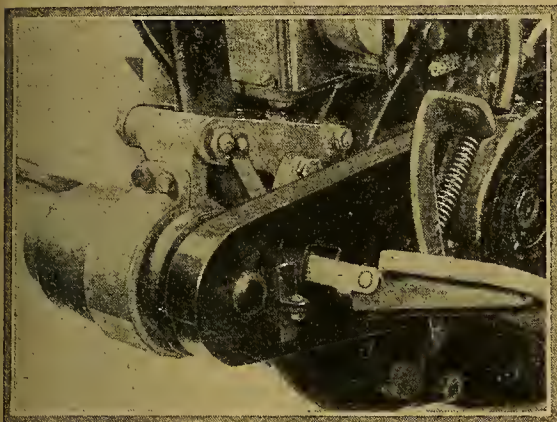
The new saddle suspension which is claimed to give much increased comfort.



**The 1918 Indians.—**

lifter may to us appear rather awkward, it undoubtedly offers its advantages.

Those who have ridden Indian machines will recall that when the rider placed one foot on the kick starter, and was compelled to hold the right grip at the



The lighting dynamo with its enclosed belt drive from the engine shaft. This, it will be noticed, occupies a position in front of the engine.

same time, the position was somewhat strained, whereas with the exhaust lifter in its present position it can be worked naturally in unison with the starting crank. Also it is very accessible for use on the road. A small spring is provided to assist in returning the lever from its "off" position.

The increased area of the brake drums not only permits sweeter action, but also tends to prolong the life of the lining materials.

It will be noticed that the new saddle is pivoted at its extreme front end, the pan being mounted on two long compression springs by the employment of bell crank levers. The combination of the spring frame with this excellent saddle certainly should give improved riding.

A new type of priming cup is fitted, and is located at the side of the combustion chamber, occupying a more accessible position than hitherto.

**Electric Equipment.**

The N-18 electrically equipped model presents several interesting points. The Dixie magneto is driven as in the ordinary Powerplus model. The cylindrical Splittorf dynamo occupies a position in front of the cradle, and is driven by means of a coiled wire belt direct from the engine-shaft. The belt runs in a substantial metal casing secure from mud and water. The lighting set is in no way interconnected with the ignition set, being separate and distinct. Thus a defect in the dynamo installation cannot affect the running of the engine. One wire leads from the generator to the lighting circuit. This wire goes to the ammeter on one side, and the main cable leads from the other side of the ammeter to both lamps. A separate lead is taken from the ammeter to the electric horn. The generator is a 6-volt d.c. type driven one and three-quarter times engine speed. It contains a cut-in and cut-out regulator which is entirely automatic in operation.

The 6-volt battery is carried in the usual battery case on the seat down tube. The head lamp contains a 6-volt 21 c.p. main bulb and a 2 candle-power auxiliary bulb. A bayonet switch permits either of these bulbs to be put into circuit as desired. The tail lamp is provided with a similar switch, and this is incorporated with the number plate securely held to the back mudguard.

**The Flat Twin Lightweight.**

Very few alterations have been made in the flat twin model. The foot-boards have been slightly altered, and give the rider a variety of foot positions. They are fitted so as to give instant access to the clutch and brake pedals simply by lifting the boards, and are strongly designed in order to protect the machine in case of a fall.

The cartridge type of spring fork has been replaced by a fork similar to that used on a Powerplus model, but of smaller size and without a scroll.

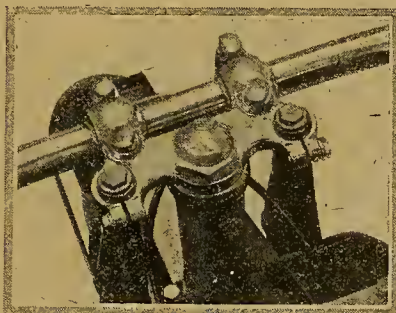
The vertical connecting links from the fork bell cranks attach direct to the end of the main spring.

Another feature of importance is in the gear lever; a sturdy horizontal lever working over a quadrant on the top of the frame replaces the vertical lever which occupied a position on the right-hand side in previous lightweights.

In order to change gear it is necessary lightly to depress the head of the plunger, then move the arm to the desired position, the locking device for the lever being more or less positive.

The enamel finish of the lightweight model is rather more attractive than hitherto, the broad surfaces of the Indian red now being relieved by a wide black stripe outlined in gold. This finish corresponds to that of the 1918 Powerplus model. The ignition on this model is fixed as hitherto, a point which does not appeal very strongly to the British rider, but the foremost aim of the designer appears to have been to obtain absolute simplicity at every point possible.

The wheels are 26in. and 24in. tyres are fitted.



In the 1918 models the handle-bars are forward of the steering head. As previously, their angle is adjustable.

**A Long-stroke Single.**

The single-cylinder Indian is designed and intended solely for commercial use. It is fitted with the usual three-speed gear and heavy clutch of the more powerful models. The engine has an unusually long stroke, the dimensions being 79.5x111 mm. It is rated at 4 h.p. The general layout of this machine is generally adapted to the strenuous demands of commercial use. It is said to possess extraordinary pulling powers at low speed, and will pick up on top gear with a very heavy load. Its main object is to pull steadily and persistently at moderate engine speed and to withstand every degree of overloading. Economy in fuel and oil has also been carefully considered, and absolute reliability aimed at in every detail of design and construction. A special steel-bodied sidecar having a capacity of 400 lbs. is turned out to accompany this model.

**AVERAGE PRICES.**

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3½ 2-speed .....	—	£40
Abingdon ..	1914	5-6 3-sp. sidecar ..	—	£54
A.J.S. ....	1916	6 combination ..	£100	£94
" .....	1914	6 combination ..	£68	£68
" .....	1916	4 combination ..	—	£75
Alcoa .....	1916	2½ 2-speed .....	—	£31
" .....	1914	2½ 2-speed .....	£27	£27
Ariel .....	1915	3½ 3-speed .....	£72	£73
" .....	1914	5-6 combination ..	—	£53
Bat .....	1914	6 3-speed .....	£48	£45
Bradbury ..	1914	4 2-sp. sidecar ..	—	£40
Brough .....	1916	3½ 2-speed .....	£52	£55
B.S.A. ....	1916	4½ sidecar .....	£56	£66
" .....	1915	4½ sidecar .....	£57	£57
Calthorpe ..	1916	2½ 2-speed .....	£31	£30
" .....	1915	2½ 2-speed .....	£24	£26
" .....	1916	2½ 2-stroke .....	£31	£28
Clyno .....	1915	2½ 2-stroke .....	—	£25
" .....	1914	6 combination ..	£55	£65
Connaught ..	1915	2½ 2-stroke .....	—	£24
Douglas .....	1916	2½ 2-speed .....	£43	£47
" .....	1915	2½ 2-speed .....	£40	£43
" .....	1914	2½ 2-speed .....	£41	£38
Enfield .....	1916	6 combination ..	£86	£84
" .....	1915	6 combination ..	—	£73
Excelsior ..	1916	3 2-speed .....	£42	£45
" .....	1915	8 2-speed .....	£40	—
H.-Davidson ..	1916	7 combination ..	£80	£84
" .....	1915	7 combination ..	£70	£70
Henderson ..	1916	7 combination ..	—	£100
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	5 combination ..	£59	£70
" .....	1916	7-9 combination ..	£70	£83
James .....	1916	4½ combination ..	£52	£67
" .....	1916	2-sp. 2-stroke ..	—	£53
Lea-Francis ..	1916	3½ 3-sp. sidecar ..	—	£63
" .....	1915	3½ 3-sp. sidecar ..	—	£58
Levis .....	1916	2½ Popular .....	—	£23
" .....	1915	2½ Popular .....	£21	£21
Matchless ..	1915	7 combination ..	£80	£82
New Hudson ..	1916	2-speed 2-stroke ..	—	£28
" .....	1916	4 combination ..	—	£60
New Imperial ..	1916	2½ 2-speed .....	£33	£34
" .....	1915	2½ 2-speed .....	£25	£28
Norton .....	1916	3½ 2-speed .....	£52	£54
" .....	1915	3½ T.T. .....	—	£43
P. & M. ....	1915	3½ combination ..	—	£60
" .....	1914	3½ combination ..	£53	£50
Premier .....	1915	2½ 3-speed .....	£47	£47
Royal Ruby ..	1916	2½ 2-stroke .....	£22	£22
Rudge .....	1916	3 Multi .....	—	£44
" .....	1915	3 Multi .....	—	£42
Scott .....	1916	3½ combination ..	—	£65
Sun .....	1915	2½ 2-speed .....	£22	£22
Sunbeam .....	1916	8 combination ..	£130	£101
" .....	1916	3½ solo .....	£76	£74
" .....	1915	3½ combination ..	£75	£76
Triumph .....	1916	2-speed 2-stroke ..	—	£37
" .....	1915	4 countershaft ..	£60	£55
" .....	1915	2-speed 2-stroke ..	—	£28
Velocette ..	1915	2½ 2-sp. 2-stroke ..	£22	£27
Zenith .....	1915	8 Gradua .....	—	£60



## The Sutton Coldfield Club Dinner.

Festivities in Honour of Capt. J. W. Woodhouse, D.S.O., M.C.

ON Monday evening last the Sutton Coldfield Automobile Club held a dinner in honour of their gallant member, Jack Woodhouse (Capt. R.F.C.), D.S.O., M.C., who was on leave from France. Capt. Woodhouse's feats as an airman are so well-known that we need not attempt to enlarge upon them; he has been decorated for exhibiting the greatest bravery in undertaking work of the utmost peril, flying at low altitudes at night time, often when the weather was bad, and playing upon enemy troops and transport trains in the teeth of heavy fire. Also it will be recalled that Capt. Woodhouse met a Zeppelin in the North Sea and drove it back towards Germany, and that on one memorable Christmas eve he challenged the crack pilot of the German lines to meet him over the trenches in aerial combat, though materialisation of his aim was unfortunately prevented—deeds which will be handed down in the history of the Flying Corps as a standard to be aimed at by every young pilot, a traditional level to inspire those who, in later days, are privileged to wear the white wings and face the perils of aerial warfare.

Naturally, the Sutton Coldfield Club is proud of its brave member, who developed his piloting instincts in the events organised by this club and in public competition generally, and, indeed, the whole motor cycling fraternity owes a debt of gratitude to those brave men whose achievements reflect honour upon the pastime, removing the foolish prejudice which was so common in the lay mind prior to 1914.

### An Excellent Dinner.

The very excellent dinner was held at the Midland Hotel, Birmingham, a large number of guests and club members being present. The tables were very tastefully decorated, and the artistic menu card, designed at the last moment by Mr. W. A. White, bore in its centre the reproduced photograph of the guest of the evening. Mr. Alec Ross presided with a humorously

masterful hand, and presented Capt. Woodhouse, on behalf of the members, with a very handsome gold cigarette case, bearing the inscription: "To Capt. J. W. Woodhouse, D.S.O., M.C., as a token of personal esteem from his motor cycling friends of the Sutton Coldfield Automobile Club, and in appreciation of his well won military distinction." A gold match-box to match was also presented, and bore the less formal inscription, "To Jack, from the Sutton boys."

Capt. Woodhouse voiced his appreciation with humorous sincerity, and his modest speech was one of the brightest of the evening. The chief speakers and those to respond to the various toasts were: Alec Ross (president), G. A. A. Bennett (Calthorpe), E. C. Paskell (Colmore), Frank Whitworth (Colmore), G. E. Urry, A. Butterworth (Levis), P. J. Evans, Jack Allday (B.S.A.), Capt. Austen, Joe Bayley (late of Fisher's Ball Bearing Co.), Capt. W. G. Aston, F. E. Baker (Precision), J. L. Norton (Norton Motors), and H. M. Batten (*The Motor Cycle*).

### Unknown Deeds of Bravery.

The chairman regretted his failure to draw from Capt. Woodhouse any anecdotes concerning his numerous adventures, and it will not be till the termination of hostilities that any of us will obtain the faintest notion as to what he, and similar shining lights, have actually done in the history of the war. Certain veiled hints of notable deeds, regarding which the public know nothing—deeds which for absolute fearlessness and unwavering gallantry are almost beyond belief—are associated with the name of this young officer in the minds of those who are in the know, and we sincerely share the desire of the Sutton Coldfield Club, which has lost so many of its members, that Jack Woodhouse will be spared to participate once more in club events—perhaps, even, to win the T.T., the failure to accomplish which was certainly not through lack of nerve or fearless riding.



Capt. J. W. Woodhouse, D.S.O., M.C.

### A MISER TO HIS "HOARD." By Sec.-Lt. R. D. C. Graham.

When I unlock the garage door to see  
No dastard thief has robbed me of my prize—  
That fear is constantly before my eyes—  
Ah! how I rub my wasted hands in glee  
And chuckle hoarsely at the sight of thee,  
Poor sorry remnant of my "juice" supplies!

My last lone can of petrol, well I know  
That when thy ultimate reluctant drops  
Are vaporised, my motor cycling stops  
For "the duration"; and if peace be slow,  
For many weary months I shall not go  
Blithely awheel by village, stream, and copse.

This thought provokes the moist unbidden tear,  
Or not infrequently the peevish curse.  
(I don't say "Blow!" but something rather worse,  
Causing a pinkness in the atmosphere.)  
Yet so things stand: and I am not quite clear  
Just how thy precious contents I'll disperse.

Shall I fare forth on some long-distance "blind"  
Which, like a swan-song, shall be very sweet?  
Or light a noble bonfire in the street?  
(For a dramatic finish I'm inclined.)  
Or keep thee here, unopened and enshrined,  
To gaze on while I wait the Huns' defeat?



## MILITARY NOTES.

## NOT MILK AND HONEY.

CPL. GURNEY GRICE (Signals), Desert Mountain Corps, E.E.F., writes: "A few days ago I received my copy of *The Motor Cycle*, and on looking through I noticed a paragraph enquiring as to who is the youngest D.R. to go on foreign service, one instance being given of a fellow eighteen years and two months with one and a half years' service up to the present time. I joined the 25th of January, 1915, my sixteenth birthday being on the 19th of June, 1914. I left England for the Dardanelles on July 4th, 1915, and have been on active service ever since, and took part in the landing at Suvla Bay, and left three days before the evacuation. We sailed for Egypt on New Year's Day, and have been to most of the principal towns. We are now in Palestine, and I do not think much of this country. Milk and honey are conspicuous by their absence. There are no roads, and gulleys and old Bedouin wells abound. If you do happen to go down one your number is up."



Cpl. Gurney Grice, of the Desert Mountain Corps, in Palestine.

ships are bad, and one sometimes wonders how they contend with them—I am speaking of D.R.'s and orderlies who are in the thick of it up the line. I quite agree with the letters that appear in your paper stating that they do not get half enough praise for the work they do."

## P. AND M.'s IN EGYPT.

L. T. H. P. BEASLEY, writing from Egypt, says: "Have turned up safely in this interesting country. It is pretty hot here, and there is nothing to be seen but clouds of dust and sand. Still, the whole thing is in its way enjoyable, and I have kept perfectly fit so far. By the way, it may interest you to know that Fords are the only things of any use out here, and, with special small platform bodies, perform marvellous work, and are the only vehicles allowed on the wire roads and tracks. The company P. and M.'s (ten) are going strong, but the riding is most uncomfortable. It is wonderful how our fellows keep them up in the sand and dust. We have had to discard the attachments—at any rate at present. Later we may be able to use them if Johnnie Turk can be shifted. He is at present sitting in quite decent country."

## GENERAL NORTHEY'S RECOMMENDATIONS.

IN the despatch received from Brigadier General Northey, C.B., a brief summary is given of the operations of the Nyassaland-Rhodesian Force. In the course of the report it is mentioned that no fewer than 450 miles of motor roads were made, and from Nwaya to the Poroto Hills, just north of New Langen-

burg, the road level varied from 1,500 to 8,000 feet above sea level.

In the list of General Northey's recommendations appears the name of Lt. H. A. E. Hall, M.C., South African Motor Cyclist Corps; while in the Mechanical Transport Service, Despatch Rider T. S. Brown, Despatch Rider Cpl. G. Cutler, and Despatch Rider W. R. Harris are mentioned.

## TWO MOTOR CYCLIST BROTHERS KILLED.

THE death is announced in *The Times* list of fallen officers of Sec.-Lt. Arthur Frederic Wellesley Greeves, North Staffordshire Regiment, who died of wounds on February 20th, aged 26. He was the eldest son of the Rev. A. Wellesley Greeves, Vicar of Oakamoor, where several hill-climbs were held before the war. He was originally intended for the Church, but finally entered the Artists' Rifles. He was an all-round sportsman and a successful racing motor cyclist.

The death is likewise announced of his brother, Sec.-Lt. John Wellesley Greeves, North Staffordshire Regiment. He was reported missing on July 1st, and is now reported to have been killed. He joined the Inns of Court O.T.C., and was granted a commission in the North Staffordshire Regiment last March. Like his brother, he was a splendid all-round sportsman and a racing motor cyclist.

The Colonel commanding wrote to his father: "Your son did his duty as becomes an English officer and a gentleman, and he did it cheerfully." Truly the country owes a great deal to the splendid motor cycle lads who have given their lives in the great cause.

## A MOTOR CYCLIST PEER.

LORD GARVAGH, who was better known to the older readers of *The Motor Cycle* as the Hon. Leopold Canning, has at present a commission as equipment officer of the R.F.C. Lord Garvagh was a pioneer motorist and motor cyclist, and was the owner of several machines in the early days, one of his favourites being the Ormonde. He was also a member of the Auto Cycle Union Committee, and did good work thereon. He was instrumental in introducing to the Auto Cycle Union the Marquis de Mouzilly de St. Mars, the donor of the Tourist Trophy, who is a distant relative of his.

## D.R.'s AND APPRECIATION.

W. PULLIN, of the 2nd Division Signals, writes: "I had the luck to come across Cpl. Thompson, W.D., who, before the war, was very well known at Brooklands and many of the hill-climbs. He has been in France since the beginning of the war, is still going strong, and as fit as ever. Many of the 'Boys' will be pleased to hear of him."

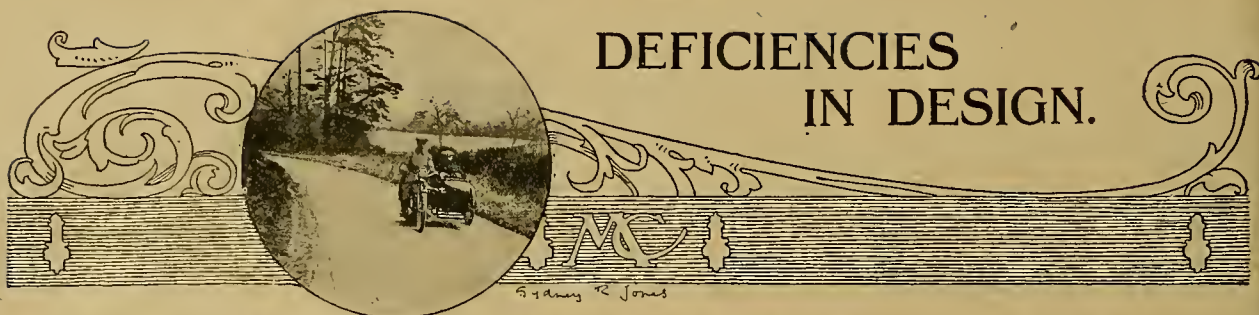
"I would not care to be a motor cyclist in France; the road surfaces are atrocious, and the grease, shell holes, and the weather are awful. The hard-



## M.T., A.S.C., GROUP.

A group of repairers to the M.T., A.S.C. Many of the men were very familiar in the motor cycle world before the war. Some will be recognised as speed merchants and others as adepts in reliability and hill climbs, others being concerned in the production of motor cycles.





## Criticisms of Pre-war Practice and Suggestions for Improvements.

IT is perhaps hardly sympathetic to hail the present enforced inaction of our manufacturers in their legitimate output with acclamation, but it is certainly time that the curve of progress of design, which took a sudden upward turn about the year 1910, made a similar leap on the way to perfection.

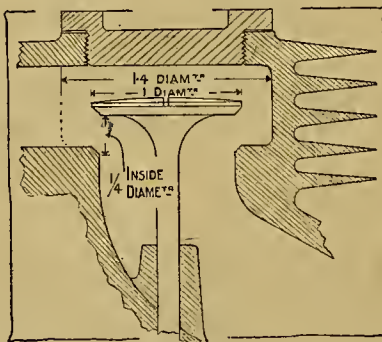
The intervening years of plenty, for the manufacturer, have not conduced to any radical changes of design. As long as each firm had a few talking points for the new year, and the machine in question was "in the fashion," so to speak, with regard to colour, outline, and the possession of certain gadgets, it commanded a large sale, generally quite as large as the factory could cope with.

The multiplication of spares and replacements had doubtless much to commend this conservative policy. The time has come, however, for a bold bid for the world's markets, and, bearing American competition in mind, to be successful the projected machines must include in their *ensemble* many features that science has shown to be necessary for long life, efficiency, and power.

The following is an attempt to outline many improvements that will have to be achieved:

### Valve Design.

The most prominent fault of the present day cylinder is the lack of sufficient space round the valve, so that virtually the only part of the valve that is useful is that part adjacent to the piston. With the largest lift that can be given to it, which is practically under one quarter of its diameter inside the seat, the distance across the valve port should be 1.4 times the valve diameter. Valve seatings are slightly on the wide side, and become more so with use. A further improvement would be—light tappets, not offset; larger cams of the external variety, making for a more sudden lift with less wear and side strain; flat valve springs, the helical type do not allow for the inevitable loss due to heat; the valve stems could be shorter, thus lessening their weight. Valve guides could be well lubricated and the valve faces preserved by a positive feed to the inlet port. The ports should be slightly more streamline than now made, and the exhaust pipe of uniform size to the rear, with the silencer as the final exit. In addition, for racing machines, balanced double-seated valves with mechanical return.



Valves not infrequently allow the passage of gas on one side only. Ample space should be provided on all sides.

### The Magneto.

It is quite one of the first principles in the study of explosives that the speed of the propagation is a function of the suddenness of its generation—witness gunpowder with and without a detonator.

This, of course, is equally apposite in the case of the petrol engine, so it is evidently of the greatest use to improve the magneto to the utmost possible extent. The usual method of advancing and retarding the spark is applied at the wrong end of the armature, and, probably on the assumption that two wrongs will make a right, the poles are drilled, slotted, bevelled, and otherwise maltreated to obtain a spark at all positions of the cam.

There are makers who have broken through the shackles of convention—or shall I say imitation?—but one in particular gives us an additional couple of air gaps, which is doubtless not an unmixed blessing. Could not that veritable lump of inertia, the rocker arm, be buried in the past, along with the ever-sticking fibre bush of dreadful memory, which is secured on its wrong surface—note the analogous instance of the Precision big end bush on the twin-cylinder model? The cams also might be shaped so that the points are broken suddenly, and then returned gradually to their original position. It should also be possible to remove the magneto for examination by simply slackening two nuts and taking off the high-tension control wires, also the switch wire, if the latter be fitted.

### Carburetter.

This is hardly a manufacturing problem for the cycle maker, as so few makes fit their own design of vaporiser, but the possession of a fine engine stimulates one to match it with a fine example of this most important accessory. It is most important that there be a control to the jet. In the case of an automatic instrument this would take the form of an enriching lever, and, in the more general pattern of cycle carburetter, simply a variable jet scaling from nothing to, say, thirty per cent. above possible petrol requirements (very useful when running on alcohol). A throttle, strange as it may sound, is *per se* absolutely unnecessary, and may be replaced, as it often is in some form or other, by a variable choke tube or series of choke tubes. Another point about carburetters is



**Deficiencies in Designs.—**

what may be styled the fallacy of the gauze (before the jet, be it understood). The jet may be nicely proportioned to the available air at first, but a few miles and there is a coating of dust and perhaps mud on the gauze, which, therefore, has its total aperture considerably reduced, thus enriching the mixture. Fine dust it cannot stop, and most of that which does pass is expelled on the next opening of the exhaust valve.

**More Engine Details.**

Roller bearings should be fitted to big end and main bearings. Aluminium pistons are very good conductors of heat, and this property should be utilised to the utmost extent. With efficient cooling the compression ratio could be slightly increased. Detachable combustion heads, preferably with the much-discussed super-imposed exhaust valve, might be combined with steel cylinders. The lubrication should be forced feed to cylinder and inlet port (preferably with a proportion of Oildag); a hollow gudgeon pin with drilled connecting rod will furnish oil to little end and big end. A draining channel from piston skirt to the main bearings is desirable, together with a suitable escape through timing gear to primary chain. An outside flywheel could with advantage incorporate a wheel drawer. In addition, for T.T. machines, there should be two or more sparking plugs. The bore might be one and one-half times the stroke, and the valve area one-third the piston area; this is easily obtained without freak design.

**Suggestions for the Frame and Wheels.**

The entire frame should be triangulated, and, with the exception of the steering column lug, be double throughout, thus immensely increasing the lateral rigidity. The head, the sole remaining single portion, would give better satisfaction, under running conditions, if it were increased in length (in some machines one hundred per cent. is not too much), and contained some arrangement of journal bearings, as well as the normally fitted thrusts, to take lateral as well as vertical shocks. The method sometimes employed of using balls a size or two larger than the curvature of

the races demand merely results in the edges of the races chipping away to the detriment of their easy running and accuracy.

An increased rake to the forks would no doubt be appreciated, together with a universally-applied capability of absorbing shocks in two directions. The fork links are perhaps the first items to give trouble, and are not usually amenable to adjustments.

The second sketch gives a section of lug and spindle which can be adjusted easily and would give no trouble.

Wheels might be improved in several ways—wider hubs, greasers through spindle, adjustable roller bearings, and in the case of front wheels and belt-driven back wheels, flanged hubs with straight radial spokes.

**Variable Gears.**

The choice of gears depends to a very great extent on the idiosyncrasies of the different buyers, but an important section of the community are fully conversant with the advantages derived from a gear with many ratios. The advent of the four-speed gear box marks the beginning of an epoch in the motor cycling world. In lieu of an infinitely variable friction gear, a six-speed box would meet the utmost expectations of the most critical.

Of course, this is not likely to be marketed for some considerable time, and is only mentioned here as a number of gears beyond which no further advantage would be gained.

Besides the foregoing specification, there are many items, such as type of transmission, exposed or enclosed chains, friction gears or dog clutch gears, single or twin engines, horse-power for solo riding, etc., etc. On these it would be invidious to make any remarks or distinctions, and, broadly, the matter may be summed up in the often heard expression, "Each is good in its place."

And now for the hope that in the post-war models we shall see unmistakable signs that a race of engineers has sprung up to take the place of that host of pioneer spirits who have brought the motor cycle to the present state of excellence in spite of the many oppositions encountered.

A. WORSDALE.

**A MAGNETO HORN: A SUGGESTION.**

MANY attempts have been made to tap the surplus electrical energy continually running to waste during the non-firing periods of the magneto, and as a simple method of illumination of medium intensity for solo machines the present systems have met with some success. There are many riders, however, nervous of additional complication, to whom the acetylene lamp, with all its messiness, is good enough, and for these the surplus magneto current might with advantage displace the present bulb horn.

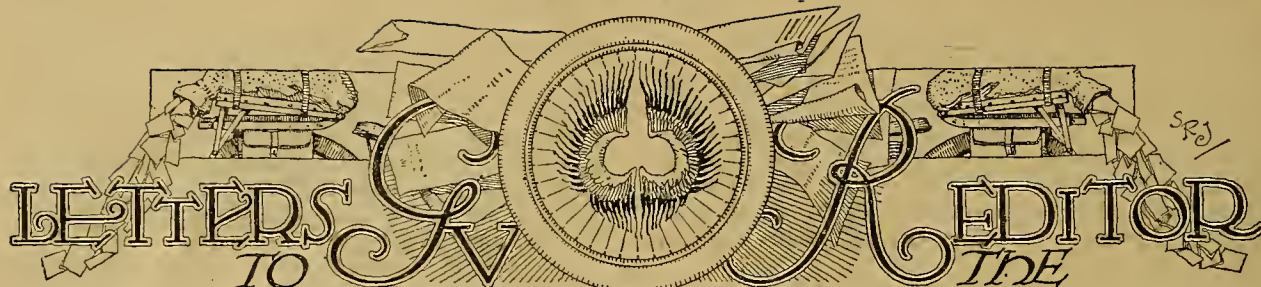
It should be a comparatively simple matter to design

a compact electric horn embodying in its interior a suitable choking coil and controlled from the handle-bar by means of a conveniently-placed push switch.

The simplicity of the wiring, involving two wires only—one to the switch terminal on the magneto contact breaker and one to the push switch—could hardly upset the equilibrium of the veriest tyro, whilst the fact that the demands on the magneto would be infrequent and seldom of prolonged duration would dispel any fear of magneto failure from the mind of the expert.

F.E.S.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Heritford Street, Coventry, and must be accompanied by the writer's name and address.

#### A FUEL QUESTION.

Sir,—Please allow me to enquire if any of your readers know what result may be expected from the use of Colzalene as a motor fuel for solo riding. I have a 1914 4 h.p. Triumph (three-speed hub) with a Triumph carburetter, and would be grateful to any who can supply the information.

E. WATKINSON.

#### A COMMERCIAL TRAVELLER'S MONOCAR.

Sir,—I am much interested in the description of the monocar on page 306 of *The Motor Cycle*.

This appears to be my mount, and I shall therefore keep an eye on the pages of *The Motor Cycle* for further developments, as I should like to be one of the first to try such a mount, simply because I find that during the winter, especially on wet runs, I invariably have sciatica for two or three days, and conclude it is from the lack of protection afforded by the sidecar.

I am now engaged upon fitting leather shields, after the style of the military jack boot, the leg coming well up to protect the thighs.

EDWARD S. DUCKER.

#### THE MEN BEHIND THE LINES.

Sir,—I am sorry to see letters still appearing in *The Motor Cycle* and other journals regarding the "safety" of some jobs at the Front as compared with others, chiefly as regards the A.S.C. Surely when all are engaged upon one object this shows a somewhat petty spirit. Of course, some jobs are, on an average, safer than others, but cannot the man in the comparatively unsafe job realise that without the assistance of the "behind-the-line" men he would be unable to carry on? Least of all should he aim his taunts at the A.S.C., who supply him with his daily bread and more besides, not to mention food for the guns, without whose support he would feel very lost. This is not the best spirit of the British soldier I am certain.

ARCHIE.

Eastbourne.

[We agree.—Ed.]

#### CENTRIFUGAL FORCE.

Sir,—In his fourth instalment of "Mechanics for the Motor Cyclist," "Mohandis" states that when a rider turns his machine in the direction in which he is falling, he steers in an arc of a circle, and "immediately centrifugal force begins to operate, acting in the opposite direction . . . and this has exactly the same effect in righting the machine as would a friendly push administered by the teacher," etc. Later in the article it is stated that "centrifugal force is not, of course, entitled to all the credit for keeping a bicycle upright," but the impression which the article is calculated to leave on the mind of the uninstructed reader is that it is the principal consideration.

As this series is intended mainly to enlighten those previously ignorant on these elementary (or rather fundamental) matters, I think it is unfortunate that this particular illustration was chosen and used in this particular way. Centrifugal force has a very small part in balancing a bicycle. The method really followed is that of constantly moving the base of support under the centre of gravity, overdoing it sufficiently to cancel the momentum sideways and downwards already produced by the original want of balance. I think that "Mohandis," having a thorough understanding of this himself, has possibly overlooked the wonderful way in which the uninstructed grasp at the smallest excuse to form a mistaken apprehension on the principles of mechanics, and would suggest that he make this little matter quite clear in a future article.

R20

There is no doubt of the great value of such articles to the motor cyclist who really desires to understand his mount. Most of the queer errors of logic one meets with in ignorant riders are distinctly traceable to want of knowledge of the fundamental laws or misunderstanding of them. Such errors are, in fact, sometimes to be observed in the writing of those who would no doubt contemptuously deny ignorance of fundamentals. A glaring example is to be noticed in last week's issue of a contemporary which shall be nameless.

A.W.T.

#### DIFFICULT STARTING.

Sir,—Your correspondent, "S.W.," in a letter in *The Motor Cycle* of September 13th, complains of difficult starting of his B.S.A. If the magneto and carburetter have normal settings, the engine should start easily when cold with the throttle open one-quarter and the air one-third, without injecting, and when hot with the air about a half or three-quarters open.

If an injection is required to free the piston, the throttle and air should be opened fully, and the engine kicked over a few times with the exhaust valve raised, and then started with a quarter throttle and full air. If this has no effect, then the spark at the plug points is probably inefficient, and steps should be taken to correct it.

There is always a reason for difficult starting, and this can be traced by the simple process of elimination. Just a few spare minutes at a machine now and then will make all the difference in riding.

A little technical knowledge is necessary to every motor cyclist to enable him to enjoy riding his machine as he should. I have seen a man kick away at a W.D. Triumph with the air lever closed, and wonder why the engine did not fire.

I get the "Blue 'Un" out here every week, and am always delighted to find each issue so chock full of interesting news and "shop."

D.R.

B.E.F.

P.S. by the Field Censor.—The man who can afford to run a motor now should give it up, and either come out as a despatch rider to B.E.F. or else buckle to at home.

[Many men use a motor cycle as the best—and in some cases the only—way of reaching their work.—Ed.]

#### AVERAGE SPEED.

Sir,—I have been following with interest in *The Motor Cycle* the discussion regarding average speeds. Some of the writers evidently have excellent roads in their localities as their speeds are astonishing. I ride a 4½ h.p. B.S.A. and sidecar combination, and am content with an average of 20 to 23 m.p.h., according to the weather. I am one of the men "on the road," and with me motor cycling is a necessity in all weathers. Recently I had a journey in County Donegal, and for about fifteen miles my average speed was five to six miles per hour. The roads here are a mass of pot-holes, and it is risking one's neck to endeavour to travel on top gear. I am afraid the curate mentioned by "Mulga" in the issue of September 6th would break his heart here.

I had a bad spill two months ago owing to the bottom bolt in the spring forks breaking. My repairer told me this was caused by a seizure, owing to abnormal friction. It is wonderful how my 'hus sticks up to the work it gets, and I have nothing but praise for the B.S.A. production. Usual disclaimer, of course.

Derry.

KUSHOFF.



Sir,—I was very interested in reading in *The Motor Cycle* of August 23rd a letter written by Mr. A. Breslau, and I can fully endorse all he says about the Rudge-Multi.

In spite of the way *The Motor Cycle* and other motoring papers have boomed the flat twin, there is still no doubt, in my mind, that for a fast, inexpensive and no-trouble solo mount the  $3\frac{1}{2}$  h.p. single, with a multi-gear such as the Rudge, has it every time. I have done about 15,000 miles on Rudges, and although driving them at excessive speeds (my present machine will do 65-70 m.p.h. on a Cowey speedometer) I have never had a mechanical breakdown. No, I think the single-cylinder will hold its own longer than some people imagine.

I have no connection with Messrs. Rudge-Whitworth, Ltd., but I am the very satisfied owner of Mr. A. R. Abbott's Isle of Man machine.

Italy. ON ACTIVE SERVICE.

### THE SINGLE V. THE FLAT TWIN.

Sir,—As a discharged despatch rider, perhaps I may be allowed a few remarks. I think the Editorial in your issue of September 20th about sums up the situation, and I see most rational bodies are taking up the pen to ridicule such a very unfair comparison.

I was attached to an advanced base station, where Triumphs and Douglasses were about equally divided. We had long runs, some of eighty or ninety miles in length, and, as we went out in pairs, often riders of a Triumph and Douglas were together, and it is surprising how the little twins performed, even in comparison; of course, they were nowhere in it when a hill had to be climbed.

Being no lightweight myself, I often sighed for the more powerful machine, or, better still, the 4 h.p. Douglas, but had to carry on with the little  $2\frac{3}{4}$  h.p., and I think there are quite a good number of D.R.'s who will plump for this machine.

Timing wheel spindles, chains, valves, forks, and carriers are the biggest source of trouble with the Douglas, I think, and in the winter freezing up, owing to the exposed position of the carburetter.

My ideal machine would be a big single with all-chain drive, such as the James. I often envied the Belgian D.R.'s their B.S.A.'s or Nortons.

H.T.B.

Birmingham.

Sir,—In your number of September 20th, Mr. Baxter, Messrs. Douglas Bros., and Mr. Hudson criticise a letter of ours which you published on September 6th.

All three correspondents take the view that it is unfair to compare the  $3\frac{1}{2}$  h.p. single and the  $2\frac{3}{4}$  h.p. flat twin, owing to the difference in cubic capacity, and to the fact that the larger engine is further assisted by an extra gear.

There is a great deal of truth in this, obviously, but it is not the point which we raised. We stated that, in our opinion, the small flat twin was less suitable for heavy work than the  $3\frac{1}{2}$  h.p. single.

Will anyone dispute the point? These are the two types supplied for D.R. work, and it is surely instructive to know which is the more suitable type for unfavourable road and weather conditions.

We are urged to compare the single with the flat twin of equal capacity, while Mr. Baxter asks us "why for sidecar work under active service conditions the 4 h.p. Douglas was the only small-powered machine considered powerful enough, and also why sidecars were not fitted to Triumphs?" We cannot tell Mr. Baxter why, because he is misinformed. Does Mr. Baxter know that the sidecar machine used by the R.F.C. is the  $3\frac{1}{2}$  h.p. single P. and M., or that Triumphs are issued with sidecars to the A.S.C.?

Unquestionably the 4 h.p. flat twin would prove more suitable than the  $2\frac{3}{4}$  h.p. The comparison would then be one of mechanical design only. We would not presume to lay down the law so far as to state that the 4 h.p. single would prove immeasurably superior.

We should choose the single ourselves, because we know that the latter does actually stand up to heavy work, and because we know that it is always reliable under the worst conditions. So might be the 4 h.p. flat twin; we should like to try it under the same conditions.

We know from experience that the twin needs more attention than the single. The former has more working parts, and consequently more sources of trouble. This last may be of very little importance to the pleasure rider at

home, because even the more complicated machine is reliable under good conditions, but it is a very real consideration to the man who must get there at all costs, and get there to time.

Now the machine which has proved itself to be the most reliable under active service conditions is likely to give the greatest satisfaction to the commercial traveller and business man at home. Such men use their machines in all weathers, and, like the D.R., must get there. Therefore, if there is anything to choose between the single and the twin (flat or otherwise) on the score of reliability, that type of machine which is the more dependable is the better for commercial work.

We agree that the  $2\frac{3}{4}$  h.p. flat twin is doing valuable service behind the line; but our contention is that "behind the line" is its sphere. Yet even there the  $3\frac{1}{2}$  h.p. single is at least its equal, and so we may say that the single will do all that the flat twin can do, but that the  $2\frac{3}{4}$  h.p. flat twin will not do all that the  $3\frac{1}{2}$  h.p. single can do. Hence the  $3\frac{1}{2}$  h.p. single is more suitable than the  $2\frac{3}{4}$  h.p. flat twin for all-round work, which is all of our contention.

Mr. Hudson says: "How on earth any sensible comparison can be made when one machine is of much greater horse-power than the other beats me." We think we have indicated how they can be compared—from the point of view of their respective suitability for all-round work. Every purchaser of a motor cycle makes this choice when he settles on his machine.

Before the introduction of the flat twin the single and the V twin afforded the only choice, and the most popular type was the  $3\frac{1}{2}$  h.p. single, for solo work. Since the introduction of the  $2\frac{3}{4}$  h.p. flat twin many choose this in preference to the  $3\frac{1}{2}$  h.p. single, and in many cases it is possibly the more suitable for their particular requirements.

As the Editorial has it in the issue of September 20th, "The main purpose served, therefore, by the correspondence now current should be to obtain some recognition of the fact that each type of machine has its undoubted sphere of usefulness and its proper place."

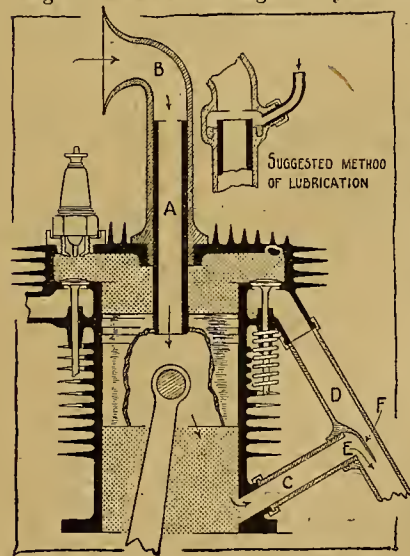
We would add that we believe the proper place for the flat twin, so far as concerns military machines, is the back area only. When considering machines for home use, this type is, we think, more suitable for the man who uses his machine for pleasure rather than for business.

B.E.F.

TWO LIEUTENANTS.

### INTERNAL COOLING.

Sir,—I enclose a design for the internal cooling of petrol engines. It was suggested to me by Mr. E. Avery Roff's design of a two-stroke engine in your issue of June 23th.



A design for cooling an engine internally.

It is operated as follows: An extension pipe A has one end fixed through the head of the piston. The other end moves up and down in another extension pipe B, which is fastened to the cylinder head. A funnel is set facing the direction of travel at the top of pipe B. The air is forced down this, through pipe A, and subsequently through the piston head into the crank case. It is then led into the exhaust pipe D, through port E and pipe C. A flange prevents the exhaust gases from reaching the crank case. The chief difficulty, as in the case of the writer referred to above, seems to be the lubrication of the tube A in the sheath B.

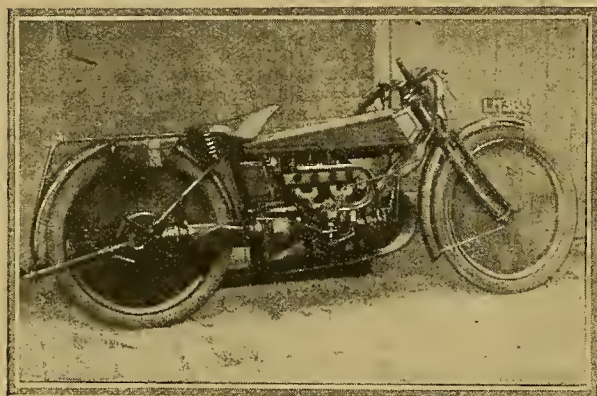
WINGS.



## TIMING AN F.N. FOUR-CYLINDER.

Sir,—In your issue of the 20th-September, I notice in the Queries and Replies columns an enquiry as to timing a four-cylinder F.N. You say the exhaust valves should open 8 mm. before bottom dead centre and close on top. I find that a far superior timing is: Exhaust valves open 30° before bottom dead centre (or 6 mm. approx.) and close 20° over top dead centre (or 3.5 mm. approx.) I know this looks remarkable, but I have had considerable experience in designing aero engines; and although the conditions at present prevent me giving results, the advantage of such a timing with automatic valves was immediately apparent. I explain it this way: The back pressure due to silencer, high speed, etc., in the cylinder, means that with exhaust valves closing on top dead centre a certain amount of inert gas is left in the cylinder under pressure, and before the automatic valves will lift, this pressure must be reduced to atmospheric pressure. By this time the piston will have descended quite a considerable distance, thereby curtailing the amount of gas that could possibly be induced.

With an exhaust valve closing at, say, 20° over top dead centre, as in my engine, the time of exhaust opening is increased, and more perfect scavenging results. Now this 20° is on the induction stroke, but the movement of the piston is relatively small for 20° as compared with the movement required to reduce from, say, 20 lbs. per square inch pressure to atmospheric pressure, as in original timing.



Four-cylinder F.N., with overhead exhaust and mechanically-operated inlet valves, converted by Olivos.

I might say that with standard F.N. cams this timing is easily arrived at, and in the tests I made the total opening of the valves was the same. I also found that the most economical setting for the inlet valves was  $\frac{3}{32}$  in. lift only with the same strength springs. Very slow running was obtained this way, and a speed of 55 m.p.h. on the 6 to 1 gear when everything was in tip-top condition. The petrol consumption averaged 85 m.p.g. The most important point to look after is air leaks in the induction pipe. My advice is to silver-solder the induction pipe on to the nipple and carefully fit into position. Soft solder holds a little while, but soon gets fatigued and cracks. If this is done the machine, in my opinion, wants some beating.

I enclose a photograph of my 'bus after conversion to mechanically operated inlet valves, but I must impress upon your readers that the timing I described is only applicable to automatic valved high-speed engines. In the converted model I use overhead exhaust valves and inlet valves in the usual F.N. exhaust pockets.

OLIVOS.

Acton, W.

## TRENCHANT CRITICISM.

Sir,—With respect to "Artificer's" criticism of the W.D. machines, I doubt if he is either giving the machines or manufacturers fair play. If he has only had eighteen machines to deal with, he has not had a great experience of them.

Let him try any shape of handle-bar he likes, and he will find that almost every rider has a different idea of shape, for he pulls and twists it into anything but a good shape.

As to wheels, did he ever take a Douglas, or any other, out that did not want adjusting, and a Triumph is a deal easier to adjust than his fancy, and if the new cups and cones he fitted lasted only three days he must have made a bad job of it.

How many big end rollers made by the Triumph has he found flattened? He must have made a mistake and fitted 1914 crank pin rivets; also, oversize rollers are issued.

The jumping of the gears he will find is caused by having an old pattern single dog layshaft; the clutch worm would not cause it if he has the proper slack in the control wire.

The rear brake has compensating action, and has had for a considerable time. There are few spring forks fitted that do not lengthen the wheelbase to some extent, but I think he will find the fork he mentions shortens it more than otherwise, unless he is going to jump the machine a yard or so high. Anyhow, it does not want to lie down at corners through side play.

There are a few things "Artificer" has not yet found out. Many of the spares are not made by the firms to whose machines they are to be fitted; therefore in most cases they are of inferior material, wrong sizes, etc.; also the firms are Government controlled, and thus are compelled to keep to the original patterns rather than have several different sizes of spares.

F. LAMB.

## D.R.'s AND THEIR WORK.

Sir,—I have found "D.R.'s and their Work," by "D.R.," most interesting, and, in most cases, very much to the point. In your issue of September 6th, however, "D.R." voices an opinion on things not covered by the title of his article, namely, "Sidecar possibilities." From dire experience, both in winter and summer out here, in the forward area the sidecar is absolutely useless. This refers to the outfits with which we have been provided; but, in any case, I cannot think of any combination which would stand up to the road conditions. Box carriers are undoubtedly extremely useful in Britain, but in France—No!

M.T. SUB.

B.E.F.

## THE POWER AND WEIGHT OF SIDECARS.

Sir,—I think your correspondent, the Rev. A. M. Walmsley, in company with one or two others, seems rather to have misunderstood my article, as I would not recommend a small, high speed, overhead valve engine for sidecar work. I took the Brough merely as representing a type so far as weight and general layout are concerned. There are in existence one or two engines of approximately the same c.c., which take a light sidecar exceedingly well, and the fact that one rider lives at the foot of a mountain range which he essays to climb at regular periods before breakfast during the monsoon, and finds the power inadequate, does not condemn the type. The idea I meant to convey was that with the much improved engines and gear boxes hovering near, the lighter outfit will show a tendency to become more and more of an established fact, eclipsing the heavyweight variety of to-day, and that therefore manufacturers need to be alive as to the possibilities of this type. If I were in the Rev. Walmsley's enviable situation, I cheerfully admit that I should regard anything under 6 h.p. as "piffle."

The Rev. Walmsley questions my knowledge of hills, so it may interest him to know that I have visited his wonderful island, and know that it contains some pretty stiff climbs. At the same time, I have seen rather worse on the other side of the Pacific, and have climbed them, too, but not —ye gods!—before breakfast.

Re "J.W.'s" criticism of Cooling and Lubrication, if "J.W." wished to elevate himself a matter of thirty feet, he might do it quite happily by walking up the nearest slope, arriving at the desired height quite cool and comfortable; but another way would be to swarm to the top-most pinnacle of the nearest telegraph pole, which would have the effect of warming him up internally as well as externally. The by-road to which I referred went more or less straight up the mountain side, while the main road made a gradual sweep to the summit, where they joined. Quite simple, *n'est-ce pas?* No, "J.W.," you do not get a vacuum in the crank case at the bottom of the piston stroke! This would be dangerous, as it would tend to suck the tappets into the timing gear. But compressed air, escaping through the port, would tend to cool the piston just as the incoming current of air would cool it at the top of each stroke.

CHINOOK.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of the envelope, and should be kept distinct from questions bearing on technical subjects.

## Fifty per Cent. Paraffin.

**?** I have a 2½ h.p. Radco motor cycle which I have not ridden since 1915. I wrote for a petrol licence, but the Committee cannot grant me one. I have some petrol by me, and mixed with 50% paraffin this would last me out. If you would kindly help me with the following queries I should be greatly obliged: (1) Shall I run the risk of being summoned for using petrol without a permit? (2.) Would the machine run all right by mixing 50% paraffin with the petrol?—H.D.

1.) Certainly you may use the petrol referred to without let or hindrance. (2.) The machine would undoubtedly run all right on 50% paraffin, but probably it would be difficult to start with so much heavy oil in the mixture. You would have to start and warm up on pure petrol in cold weather.

## A Punctured Float.

**?** About three months ago I went for a forty miles run, during which my machine ran well; but a few hours later, on starting back, I first noticed misfiring, and found that the carburetter flooded badly; I also could not regulate the speed by means of the carburetter. The machine would start after a squirt of petrol and give one or two kicks, with the throttle a quarter open and the air closed (B. and B. carburetter); but when on the road, directly I began to open the throttle the machine would slow down. The engine seemed almost to stop, then immediately afterwards it would begin to pick up again, but in a very jumpy manner; afterwards it would go quite all right and at a great pace, but I had to be very careful how I opened the air lever or it would begin to slow down again. I always have to be very careful how I open the air lever or the engine will also knock. Do you think this may be due to the oil? I have noticed since using T.T. oil instead of B.B. the engine has not knocked so badly. I have cleaned out the carburetter, and the petrol seems to run quite freely everywhere; but I find some petrol in the float. Should this be so? I have searched for a leak in it, and it is impossible to find one. Does it matter much if there is a slight air leak between one of the tappet stems and guide?—R.B.

We hardly think the oil would cause your trouble, but obviously there must be a leak in your float. These leaks are very hard to find, as there might be a tiny

crack or flaw at one of the soldered joints, and the petrol, being capable of passing through a very small hole, will eventually enter the float, with the result that this gets weighted, and too strong a mixture is given off owing to slight flooding. The best way to spot the leak is to stand the float on a hot shovel or immerse it in boiling water, push it down under the surface of the water, and when the petrol gas is given off the presence of the hole will be shown by bubbles. Having noted the position, empty the float by again plunging it into hot water, keeping the leak downwards till all petrol is forced out by the expanding air, then skilfully apply a spot of solder, taking care not to weight the float. It does not matter if there is an air leak between the tappet stem and guide.

## Boring Out a Cylinder.

**?** (1.) I am thinking of boring out my cylinder, which has worn oval. Can this be done in a good lathe? (2.) When turning piston rings, how much larger should they be made than the bore of the cylinder? (3.) What is the easiest way to cut stepped piston rings? (4.) What are the advantages gained by turning piston rings eccentric?—R.D.

(1.) This can be done on a good lathe, but an amateur to effect such a task would have to be highly skilled in the

use of a lathe. (2.) The piston ring should be turned to the same size as the cylinder, and afterwards hammered out. (3.) Cut straight across with a hack saw, then file out the square slots by means of a file. (4.) To obtain greater evenness of pressure on the cylinder walls.

## Which Way to Lean.

**?** I should be much obliged if you would give your expert opinion on a little matter which has been the cause of much argument in our mess. The subject under discussion is methods of "cornering" (at speed). In taking a corner to the left on a flat road it has been my contention that the motor cycle should be leant to the left and the rider's body to the right, and that the corner can be taken faster in this manner than by the older method of leaning and steering in the same direction.—F.C.H.

In cornering it is purely a matter of taste whether one leans with the machine or keeps one's body vertical. Most riders feel, and consequently are, safer by keeping their bodies vertical, or even leaning in the opposite direction, but theoretically this makes no difference as regards the tendency of the machine towards skidding, while one is apt to strike one's footrests by leaning the machine only. Most speed riders keep their bodies vertical, and we think it is the more natural position at high speeds.



WHERE OWNERS OF SPRING FRAMES SMILE.

A sample of the roads one encounters in many of the munition towns in the Midlands



## Clutch Slip with a Hub Gear.

**?** I recently had trouble with my Mark VI. Armstrong three-speed gear, and sent it to a firm in London to have it overhauled.

When the firm in question returned it, they said they had made the clutch rather free, and that it was possible that after some time the clutch might begin to slip. (1.) Should this happen on a long journey, could you tell me how to adjust the clutch myself? I understand how to remove the gear from the hub shell. (2.) I find that when the wheel is detached from the bicycle, if I adjust the right cone so that there is no side shake in the belt drum, the free wheel pedalling sprocket is very stiff (too stiff to start by means of the pedals), when the wheel is attached to the bicycle again and screwed up tightly. Am I right in loosening the right cone to free this pedalling gear so long as there is no side shake in the belt drum with the wheel in position? (3.) I cannot manage to keep the large nuts tight which secure the gear wheel to the bicycle. After a very few miles they become loose, and there is in consequence side shake in the belt drum. I have tried securing the main nuts by screwing up others tightly against them, but they all turn after a few miles, in spite of their being a good fit on the spindle. On the clutch side I have used up all the intervening space between the nut and the clutch operating mechanism by other nuts and washers, but if I do this on the gear side I am afraid that they will all turn slightly, and consequently damage the gear operating rod or mechanism. I should be most grateful for your advice.—H.P.

(1.) The Mark VI. gear has a clutch which is somewhat difficult to adjust, and it should be adjusted so that it is rather fierce. Should clutch slip develop on a long journey, and the rider can take the interior out of the wheel (see the issue of *The Motor Cycle* for December 7th, 1916), it is a fairly simple matter to tighten the clutch. The axle is placed in the vice with the clutch plates uppermost, the axle nut is screwed on, and afterwards the clutch worm, so that it is flush with the end of the axle. The clutch worm should then be locked by means of the axle nut, so that it cannot be moved. Next insert the push rod and put the clutch worm cap on the worm with a piece of steel through one of the round holes. You will then be able to get the clutch into free position by turning the worm cap by means of a large shifting spanner. The tension is then taken off the clutch plates, and it is an easy matter to screw the top clutch adjusting nut round with a peg spanner, but after doing this it is essential to see that the locking spring on the clutch adjusting plate is pushed back, between one of the slots in the clutch body. (2.) The right-hand cone does not run on ball bearings, and consequently must not be adjusted too tightly, while there should be a slight amount of side shake in the belt drum. (3.) You should be able to overcome the difficulty with the axle nuts by fitting the standard Armstrong D washer,

with a locking screw through the axle nut, or by fitting a spring washer without the D washer, but the tightening must be effected by means of a very large spanner. It is also possible, of course, to use one of the patent lock washers, of which there are a large number on the market, such as the Perfectlock.

## READERS' REPLIES.

## Timing a Four-cylinder.

I see in *The Motor Cycle* for September 20th that "J.H." is asking advice in "Queries and Replies" about the unsatisfactory running of his four-cylinder F.N., so if my experience with this make is of any value to him he is heartily welcome to it. The machine (late 1911 pattern) when delivered new to me was capable of only just over 40 m.p.h., and this I found was entirely due to the inlet springs not being strong enough; so having obtained two spare springs I cut them each in half, and put the extra half springs on each valve stem, carefully testing the four valves against

## IMPORTANT NOTICE.

## GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

each other to see that all springs were the same strength. The result was surprising, the speed being increased about 18 m.p.h. I also found that there was serious misfiring at very low speeds, so I tried an experiment with the Lodge plugs, opening the points to almost  $\frac{1}{16}$  in. This absolutely cured the defect; why, I cannot explain. The F.N. automatic carburetter I found did not supply enough air at high speeds, so this was remedied by boring a  $\frac{1}{16}$  in. hole in the inlet pipe and fitting a slide to cover it. Once under way, this was opened, and could be left open for all but the slowest speeds. The machine was delightful to ride, and capable of a very high average speed with comfort, and the shaft drive could be absolutely ignored. I think that *après la guerre* the four-cylinder will come to stay, as, no matter what the speed, high or low, one never "feels the engine." The journey from Northampton to London (seventy miles) I used to do in an hour and threequarters, and there are numerous ten-mile limits on the way, so the machine could surely hop it on the deserted stretches. I might mention that neither clutch nor speed gears were fitted. I should be glad to answer any other queries from "J.H." or others. Usual disclaimer.—C.H.L.

## Pre-ignition.

With regard to the query by "H.F.A.E.," in your issue of September 20th, and your reply thereto, I may say I experienced a similar mysterious

trouble, which puzzled me for some time, but which, when discovered, proved to be due to the simplest thing imaginable; and the defect in your correspondent's machine may be due to the same cause. My machine was a  $2\frac{1}{2}$  h.p. F.N. It would start up and run for about a quarter of a mile, and then stop, being most persistent in this. I spent considerable time in searching for the cause, which was most puzzling, as on examination after the stoppage everything appeared to be in order, and the engine would fire and run for another quarter of a mile. However, I eventually found the defect was due to the following: On the F.N. tank there is a needle valve, which can be screwed down to cut off the petrol supply to the carburetter, and underneath the head of this valve (outside the tank) there should be a light spring, but which was missing from my machine. I discovered that the vibration, when running, was sufficient to work the needle valve down and intercept the flow of petrol from the tank to the carburetter, but not cut it off altogether. Consequently by the time I had dismantled from the machine to inspect the carburetter, which was under suspicion, the float chamber was full of petrol. The matter was, of course, easily remedied when discovered, by fitting part of a discarded valve spring under the head of the needle valve, which prevented it from working round with the vibration and temporarily cutting off the petrol supply.—D. R. BROOKS.

## RECOMMENDED ROUTES.

PETERBOROUGH TO WITHAM.—R.B.  
Peterborough, Stilton, Huntingdon, Cambridge, Linton, Haverhill, Braintree, Witham. Approximately 85 miles.

GRINDLEFORD TO TATTERSHALL.—W.G.  
Grindleford, Baslow, Chesterfield, Mansfield, Newark, Leadenham, Sleaford, Tattershall.

MAIDSTONE TO WOBURN.—V.G.R.  
Maidstone, Wrotham, Meopham, Gravesend, by ferry to Tilbury, Brentwood, Chipping Ongar, Harlow, Stanstead Abbots, Ware, Hertford, Hatfield, St. Albans, Dunstable, Hockliffe, Woburn. Approximately 95 miles.

BOLTON TO LINCOLN.—F.H.L.  
Bolton, Manchester, Stockport, Chapel-en-le-Frith, Baslow, Chesterfield, Newark, Lincoln. Approximately 110 miles.

OXFORD TO EXETER.—G.D.F.  
Oxford, Faringdon, Swindon, Devizes, Trowbridge, Beckington, Frome, Shepton Mallet, Glastonbury, Durston, Taunton, Wellington, Cullompton, Exeter.

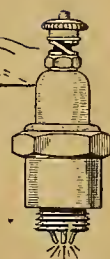
IPSWICH TO BLACKPOOL.—J.H.H.  
Ipswich, Hadleigh, Sudbury, Haverhill, Linton, Cambridge, Huntingdon, Thrapston, Kettering, Market Harborough, Leicester, Ashby-de-la-Zouch, Burton-on-Trent, Tutbury, Uttoxeter, Stone, Pipe Gate, Woore, Nantwich, Tarporley, Warrington, Wigan, Preston, Kirkham, Blackpool. Approximately 250 miles.





# ACETYLENE AS A MOTOR FUEL.

## ITS POSSIBILITIES AND DISADVANTAGES AS SHOWN BY TESTS.



**A** CETYLENE when mixed with air in the right proportions is very explosive, and when liquefied may be detonated by means of an electric spark. For this reason its sale in liquid form is prohibited. However, it need only be considered in its gaseous form, in which state it is quite explosive enough, as the following test will show.

### The First Test.

A 1910 Douglas engine was rigged up on a bench, just the same as if it were to be run on petrol; in fact, no alteration was made except that a tube from an acetylene generator was fitted to the air inlet of the carburetter. It was found that the engine would not start at first (possibly due to the automatic inlet valves sticking), but on injecting a few drops of petrol into each cylinder it began to fire. After running for a few minutes there was a loud crack, and the engine pulled up dead with a broken crankshaft.

It is rather surprising that the crankshaft went instead of the cylinder head, especially as the engine was running light. This was probably due to its having been strained on some former occasion, so that it was not strong enough to stand the extra explosion pressure. Had the machine been on the road and the engine under load there is no doubt whatever that the damage would have been more extensive.

### Cost.

Another factor which prohibits the use of acetylene is its cost. One pound of commercial calcium carbide produces about four to five cubic feet of gas, which would only be sufficient to take a  $2\frac{3}{4}$  h.p. Douglas about three or four miles in spite of the large quantity of air required—not a great distance with carbide at the present price. This alone is sufficient to condemn it as a fuel for the average motorist. However, when using it in conjunction with other fuel as described below, only about one-third of a cubic foot per gallon would be required; hence the cost would not be of so much account.

### Solubility.

The other use to which it was applied was suggested by the fact that it is soluble in various liquids, including paraffin. Now 100 volumes of paraffin at normal temperature and pressure will absorb 150 volumes of acetylene. It was therefore thought interesting to see what difference its presence would make to the behaviour of the fuel.

For the benefit of the non-technical reader it would be as well to explain that the gas when dissolved in a liquid is not in the same state as liquid acetylene. In order to liquefy it at ordinary atmospheric pressure, the low temperature of  $-82^{\circ}$  C. would be required.

### The Second Test.

The test was carried out on a 12-14 h.p. Sizaire-Naudin two-seater fitted with a Zenith carburetter. The car would run on substitute but had to be started with petrol, and was found to accelerate badly when using heavy fuel.

The tank was filled with paraffin in which acetylene had been dissolved. The engine would not start with-

out petrol, but after changing over to the paraffin mixture it was found to accelerate and be as flexible as when running on the lighter spirit. This was probably due to the gas coming out of solution under the reduced pressure caused by the suction of the engine, and in so doing atomising the paraffin to some extent.

The fact that the explosive gas had no ill effects in this case was due to its being considerably diluted with the paraffin vapour. In the same way some have been successful in running on acetylene alone because they have had an insufficient quantity of air for complete combustion, or an excess which would to some extent damp the explosion.

This article does not by any means exhaust what might be said on acetylene as a fuel, nor does the writer consider a single experiment is sufficient to prove any phenomenon, but he hopes that it may throw a little light on a subject in which, no doubt, many motor cyclists are interested.

R. G. HOWARD, A.C.G.I., B.Sc.

### AUSTRALIAN TRADE AND AMERICA.

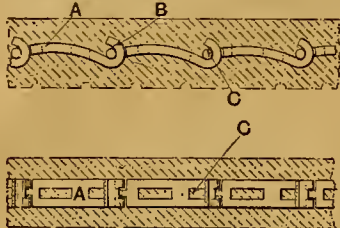
**O**UR Australian representative informs us that the managing directors of several well-known American manufacturing firms are at present visiting Australia, with the object of organising their retail branches out there. He adds that British machines are very much more popular than Americans, but are at present unobtainable, and that British manufacturers will, after the war, receive a very hearty welcome in Australia if they will follow the example of the Americans, and establish some sort of organisation out there.





#### An Articulated Belt.

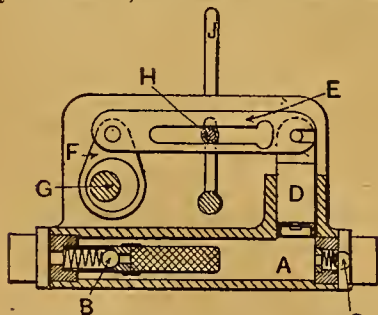
This belt consists of a series of metallic plates A, each of which is formed at one end with a hook portion B, and at the other end with an eye portion C, so that a complete transmitting member may be assembled. The plates A are preferably given a slightly arched form as illus-



trated, and the whole of the chain is then embedded in a solid body of rubber. The object of arching the plates is to enable them to yield slightly, so facilitating the placing of the belt upon its pulleys.—C. Lee, No. 107,805.

#### A Variable Delivery Oil Pump.

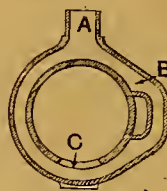
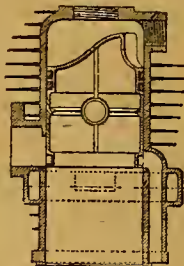
This is a mechanical pump adapted to be driven from the engine and to supply a variable quantity of oil dependent upon the setting of an operating lever. The pump barrel is shown at A, and is provided with an outlet valve B and an inlet valve C connected up to the required piping. The pump plunger D reciprocates in a branch extending from the main cylinder, and is actuated through a lever E acted upon by a crank F, which in turn is driven



from the engine through the medium of an eccentric G. The lever E rocks upon a pivot H carried by a lever J mounted upon the pump body, and the lever J is movable to vary the position of the pivot H, so that the lever E rocks about a movable fulcrum, enabling the effective movement of the plunger D to be varied. The lever E is provided with a slot to receive the movable pivot H, and one end of the slot is formed with an enlargement. When the pivot is moved completely across into the enlarged part of the slot, no motion will be imparted to the plunger D.—J. S. Spittle, No. 107,337.

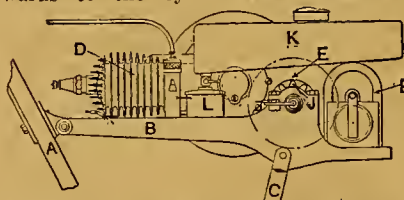
#### Two-stroke Induction Improvement.

The drawings illustrate in vertical and horizontal section a cylinder having a peculiar arrangement of induction passage, the object of which is to give a long path to the ingoing gases on the way to the crank chamber, so that the gases are heated up and efficient vaporisation obtained. The carburettor is attached at A, the ingoing charge passing through the passage B, which is cast integral with the cylinder. The gas follows the course of the passage, gaining the interior of the cylinder at C, and thence finding its way into the crank chamber when the passage C is opened by the piston. It will be seen that the gas has thus to traverse a considerable distance, with the advantage above stated, and also preventing any serious loss due to blow back or rebound.—D.F. and M. Engineering Co., Ltd., and W. V. Ford, No. 107,834.

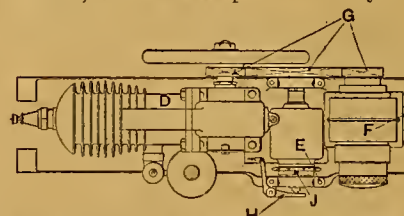


#### An Auxiliary Power Unit.

This unit is located at the rear of the saddle stays A, upon a platform B, provided with struts C, extending downwards to the cycle frame. The en-



gine D is arranged in a horizontal position, and directly behind it is mounted a countershaft E, and behind that again the magneto F. The countershaft and magneto shaft are driven from the engine by spur gears, indicated diagrammatically at G in the plan view. The countershaft is provided with a clutch device operated from a bell crank lever H, so that the sprocket J may be



caused to transmit the drive or the engine allowed to run free when desired. The countershaft is arranged as nearly as possible over the upper end of the supporting struts C, and the tank K is arranged over the countershaft, being connected to the carburettor float chamber L by a simple union.—H. H. Patrick and the Patrick Engineering Co., Ltd., No. 107,314.



#### Concrete Roads.

We are in receipt of a booklet issued by the British Reinforced Concrete Engineering Co., Ltd., 1, Dickinson Street, Manchester, dealing with reinforced concrete roads which have been so successfully laid in various parts of the country. The method employed is to put down a concrete foundation, and in the centre of it a binding system, consisting of a special form of wire netting. Over the top is laid an asphalt surface or a coat of tar, on which granite chips are laid before it dries. The actual foundation of the road is old concrete.

#### Economy in High-speed Steel.

Now that the cost of high-speed steel is so high, many metal products, including lathe, planer, and shaper tools, countersinks, screwdrivers, and other tools, in which the use of high-speed steel is necessary only at the point of stress, welding has been resorted to, and short lengths of high-speed steel welded on to the less costly metal. Details of this process can be obtained from Messrs. Barimar, Ltd., Oxford Street, London.

#### Reviews.

"Practical Costing," by A. H. Gledhill, A.M.I.M.E., 3s., the Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, London, S.W.1. This useful book, written at the request of a large number of firms in the engineering trade, is of undoubted value to the motor cycle manufacturer on a large scale.

A booklet has recently been published by Messrs. Jordan and Sons, Ltd., 116 and 117, Chancery Lane, London, W.C.2, entitled "Registration and Publication of Directors' Names, The Companies (Particulars as to Directors) Act, 1917." The author is Mr. Herbert W. Jordan, and the book is sold for the sum of 4d. It explains an Act which is not generally understood, and should be of considerable value to business people.

#### Sale of a Well-known Business.

Mr. John Piggott has sold his business to Messrs. A. W. Gamage, Ltd., and Messrs. Benetfinks, Ltd. Messrs. John Piggott, Ltd., 117, Cheapside, London, E.C., have carried on a prosperous business as outfitters and accessory dealers in the City for nearly fifty years, and their name has been long before our readers. Mr. John Piggott himself, who managed his firm in a thoroughly businesslike way, and when motor cycling came into vogue made a special effort to look after motor cyclists, recently decided to retire, as he was getting on in years, and felt that the management of the company was a somewhat severe strain upon him, especially as both his sons are serving with the Colours. Mr. John Piggott, jun., had to join up immediately war was declared, as he was a very old member of the Honourable Artillery Company.



# GEAR REPAIRS.

Whatever your gear is WE can repair it promptly.

Is it STURMEY-ARCHER  
or ARMSTRONG ?

We have specialised in repairing these for the past three years, and have **EVERY PART** for **EVERY TYPE** *actually in stock*. Where desired, parts can be supplied by return post. **GEARS REPAIRED IN SIX HOURS** with tested parts, exactly as supplied by us to the British and Allied Governments

## READ WHAT CUSTOMERS SAY :

Victory Cycles and Motor Cycles,  
Witham, Hull, 12th April, 1917.

Dear Sirs,—I thank you for the prompt despatch of wheel, and also for the parts returned. Our customer is highly satisfied, and the gear is now as good as when new.

Yours truly, A. E. BROWN

Lydd, Kent, 17/7/17.

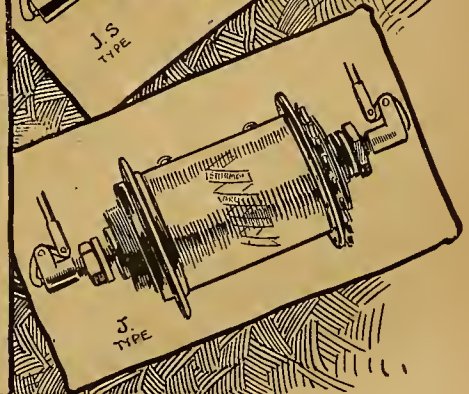
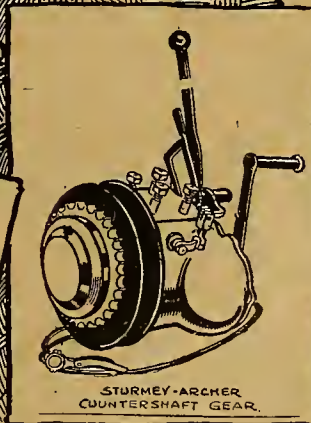
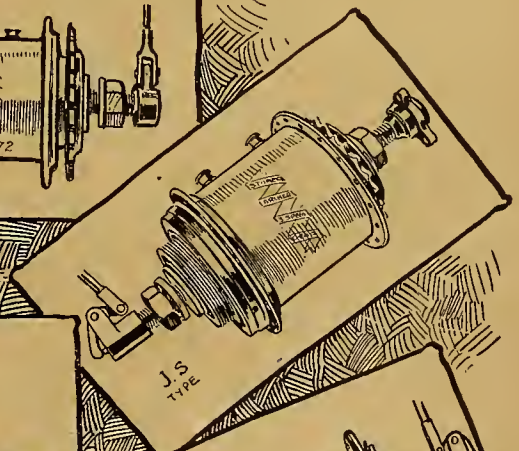
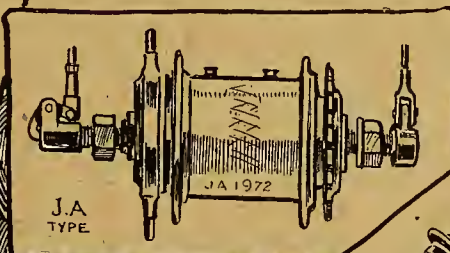
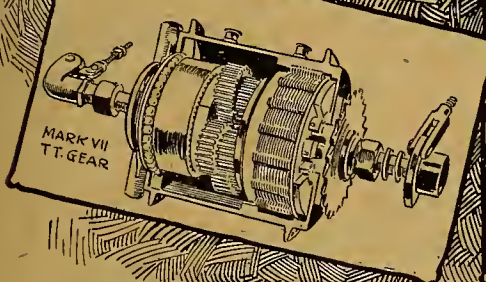
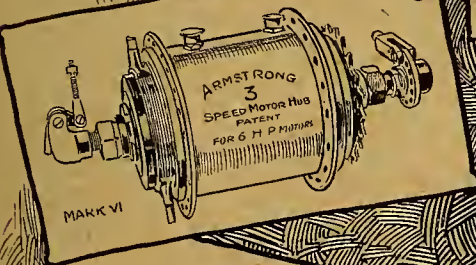
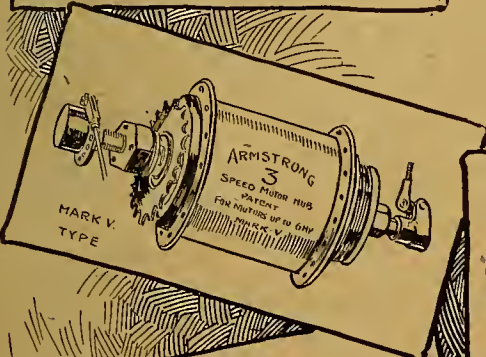
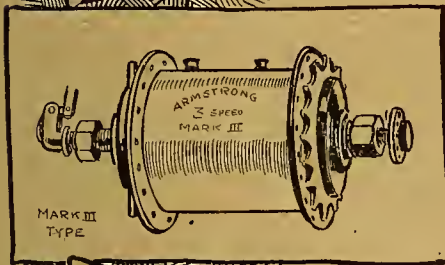
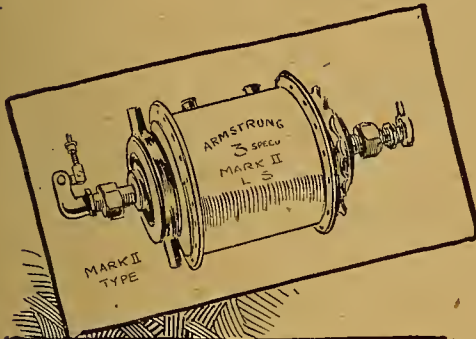
Dear Sirs,—My J.S. gear arrived yesterday and I was able to subject it to a road test. I am pleased to say that the gear is now quite satisfactory in every respect. Thanking you for the prompt attention. yours faithfully, HERBERT VIELER.

**IMPORTANT.**—When sending wheels or gears, see that your name and address are plainly written on two labels. Remove all outside fittings, such as clutch or gear controls, push rods, axle nuts, washers, etc. Advise us by post of despatch.

Make a note of address. If you have gear troubles, write, wire, 'phone, or call. Send wheels to Hounslow, L. & S.W. Ry., clearly labelled with sender's name. Nearest station for callers, Heston—HOUNSLOW, District Railway.

**COUNTY ENGINEERING CO.,**  
**64, STAINES ROAD, HOUNSLOW, LONDON, W.**

Wires : "Threespeed, Hounslow." 'Phone : Hounslow 322.





# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements must be made payable to **ILIFFE & SONS Ltd.**, and crossed **ILIFFE & SONS Ltd.**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### A.B.C.

**1914** A.B.C. Motor Cycle for sale, 3-speed countershaft, lamps and speedometer, good condition; £45, first cheque secures.—Box 1,300, c/o The Motor Cycle. [X6365]

### A.J.S.

**A.J.S. Spares;** prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

**1916** A.J.S., T.T. model, 2-speed, kick start, very good condition; £43/10.—Walsall Garage, Walsall. [X5858]

**A.J.S. 6h.p. Combination,** with hood, screen, 3 Lucas lamps, speedometer, in really topping condition; £77/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8642]

**1914** A.J.S., 6h.p., 3-speed countershaft combination, hood, luggage grid, lamps, horn, in excellent condition; owner joined H.M. Forces; 65 gns.—P. Driscoll, 58, Woodfield Rd., Ealing, W.S. [8472]

**A.J.S., 1915, 4h.p.,** excellent condition, speedometer, tyres practically new, electrically equipped; £67/10, or exchange for up-to-date combination, with cash adjustment.—Edward Haude, Solicitor, Loughborough. [X6082]

**A.J.S., 2½h.p. (1915),** with 3-speed countershaft gear, clutch and kick starter, engine recently overhauled, tyres in good condition; £47/10; extended payments arranged.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [8718]

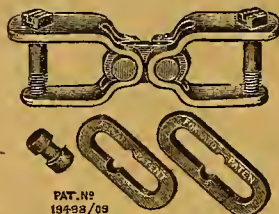
## FORWARD FACTS

### The Steel Links of the Forward Fastener

are stronger than any other form of hook—

They can never become unhooked in use—

They cannot possibly catch your spokes in case of belt breakage:—



### The Forward 1/6

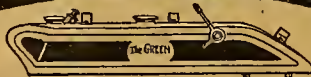
Record breakers always fitted them in the pre-war period.

And to-day they are faithfully serving our despatch riders on all the fronts.

They will serve you just as faithfully. Catalogue from

**FORWARD MOTOR CO.,**  
35 Forward Works  
Summer Row,  
BIRMINGHAM

## Petrol & Oil Tanks



Specialists in highest grade tanks. Satisfaction guaranteed. Trade enquiries solicited.



Auxiliary tanks stocked in 8 sizes, with filler, tap, clips, T piece, and piping from 6/6.

**A. GREEN, Water St., Blackfriars, Manchester.**

## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the production of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**A.J.S. 6h.p. Combination, 1917; £115/10.**—H. Taylor and Co., Ltd., 21a, Store St., W.C. [X6302]

### Alldays.

**COLMORE Depots, Birmingham and Manchester,** for immediate delivery of Allon 2-strokes. [0796]

**ALLON, 1916, 2½h.p., 2-speed, 2-stroke, 2 lamps, horn, appearance and condition perfect; £30.—31, Demesne Rd., Manchester.** [X6049]

**ALLONS, 2½h.p., 2-speed, and clutch; cost £50; cancelled order, new; take £42/10.**—H. Taylor and Co., Ltd., 21a, Store St., W.C. [X6305]

**ALLON (new), 2½h.p., 2-stroke, all models in stock for immediate delivery; the stoutest lightweights; extended payments arranged.**—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [8715]

**ALLON, 1915, 2-speed, 2-stroke, pan saddle, £39/10; single speed (new), £36; 2-speed, new, £42; 2-speed and hand clutch, new, £45; extended payments or exchange.** Alldays Allon, 1915, 2-speed, Dunlop tyres, enamelling and plating good, £30/17/6.—Service Co., 292, High Holborn. [X6337]

### Ariel.

**ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.**—Crow Bros., Guildford. [2562]

**COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester,** for all models of Ariels. [0797]

**1917** Ariel 3½h.p. Combination, practically new.—For particulars apply, Sharman and Ladhury, Melton Mowbray. [X6310]

**1914** Ariel, 6h.p., Bedford 2-speed gear, C.B. sidecar, all accessories, new 31u. tyres.—£44.—Ross, 86, High Rd., Lee. [8736]

**ARIEL Combination, 3½h.p., 3-speed, clutch, lamps, tools; £35, with petrol; letters only.**—Advertiser, 5, The Crest, Headon, N.W. [8634]

**ARIEL, 1915, 3-speed, and clutch, 5-h.p., spring seat-pillar, Dunlop tyres, hood and screen, Lucas lamp and Cowey speedometer; £71/15; extended payments or exchange.**—Service Co., 292, High Holborn, London. [X6338]

**ARIEL (new), 3½h.p., 3-speed countershaft gear, clutch and kick starter, decompressor, patent spring seat pillar; £72; extended payments arranged.**—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [8716]

### Arno.

**3½h.p. Arno, 3-speed Armstrong hub gear, good order; £20.**—Jones' Garage, Broadway, Maswell Hill, N.10. [8069]

### Auto-Wheels.

**WALL** Auto-Wheel, used very little, splendid order; accept £6/6, quick sale.—Millard, Sydenham Rd., Guildford. [X6202]

**AUTO-WHEELS.**—Three B.S.A. models at £7/7 and £10/10; and a 1917 unused model £12/12, a real bargain; exchanges, easy payments.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8646]

### Bat.

**BAT, 6h.p., late 1914, special ball bearing engine, 3-speed countershaft and kick-starter, lamps, speedometer, in fine condition; £45.**—Rosemeath, Beverstone Rd., Thornton Heath. [8748]

### Bradbury.

**BRADBURY, 1912-13, 3-speed, and coach sidecar; £35/10.**—Motor Exchange, Horton St., Halifax. [8615]

**BRADBURY, 4½h.p., T.T., 1912 model, very low; 15 gns., worth £25.—66, Greyhound Lane, S.W.16.** [8675]



## MOTOR CYCLES FOR SALE.

## Brown.

31 h.p. Brown, N.S.U. 2-speed, in fine order: £22.—  
 32 Jones' Garage, Broadway, Muswell Hill, N.10.  
 Deferred payments arranged. [X068]

## B.S.A.

B.S.A. 1916 Combination, £66; also a 1915 combination, £58.

B.S.A., 1916, 3 speeds; £55; all in perfect condition.—Percy and Co., 337, Euston Rd., London. [X792]

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [X0798]

15 B.S.A. and Sidecar, all chain drive, good condition; £50.—Ross, 86, High Rd., Lea. [X8737]

17 B.S.A. and coachbuilt sidecar, complete, lamps, horn, etc.; £66.—Cross, Jeweller, Rotherham. [X6328]

B.S.A., 1912, 3½ h.p., 2-speed free hub, cane enclosed sidecar; £32.—Farrow, Cherry Tree, near Blackburn. [X6240]

31 h.p. B.S.A., 1913, 3-speed, and coach sidecar; £35, 2 near offer.—Berryman, King St., Redruth, Cornwall. [X6277]

B.S.A., 4½ h.p., with special coachbuilt sidecar, and accessories; £65.—Colmore Depot, 31, Colmore Row, Birmingham. [X6318]

14 B.S.A. and Sidecar, lamps, etc., in perfect order, small mileage; seen any time; £58.—R. C. Meek, 354, Archway Rd., Highgate, London, N.6. [X8553]

B.S.A., 4½ h.p., late 1916, and coachbuilt sidecar, chain-cum-belt drive, fully equipped, and in splendid order; 62 gns.—H. Pool, 150, Hurlley St., Burnley. [X6254]

B.S.A., 1916 Model K, Canoelet sidecar, lamps, speedometer, luggage grid, Walbro screw, perfect order; £65, or solo and cash.—W., 18, Wellesley Rd., Colchester. [X8635]

B.S.A. 1913 4½ h.p. 2-speed Combination, chain drive, in splendid condition, new tyres, lamps, all tools and accessories; bargain, cash only, £48.—Brydon, Llay, Prestford. [X6296]

B.S.A., bought June, 1917, run 500 miles, all chain drive, 3-speed, chain cases, lamps, horn, and spares; a bargain, £50.—Oram, Colin Park, The Hyde, London. [X8729]

B.S.A. 1917 Combination, 3 speeds, chain-cum-belt, wind screen, fast and economical; any examination; excellent condition; £68.—O.B., 61, Station Rd., Larneside. [X5845]

B.S.A., 1914, countershaft 3-speed, all chain, smart, coach sidecar, all accessories, speedometer, excellent order throughout; £45.—C.P., 58, The Limes Ave., New Southgate, N.11. [X8660]

B.S.A. Combination, late 1914, 3-speed countershaft gear, engine overhauled by makers this season, runs all practically new, lamps, tools, spares, will run on paraffin; £50, or near.—Highmore, 108, Russell St., Jersey. [X6225]

B.S.A. Late 1914 4½ h.p. Chain Drive Combination, excellent condition, 26x2½ in. Palmer cords all heels, new spares, Cover speedometer; £50; Saturday or Sunday, after 2, or appointment.—12, Broomfield Rd., Surbiton Hill. [X8665]

B.S.A., late 1915, 4½ h.p., 3-speed, and Millford coachbuilt sidecar, a fine turnout, and carefully used, complete with 3 lamps, horn, speedometer, and tools; £57/10, or near offer; any trial; would consider light-eight as part payment.—Tilt, Midway Rd., Swadincote, near Burton-on-Trent. [X6223]

## Calthorpe.

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [X0799]

1917 Calthorpe-Jap, 2½ h.p., 2-speed, new, just delivered from works; £41. Walsall Garage, Walsall. [X5856]

CALTHORPE 2-stroke, 1916, Enfield 2-speed, fine condition; £26.—Brierley, The Willows, Hartford, Cheshire. [X6299]

CALTHORPE-J.A.P., 2½ h.p., 2-speed, 1916, nearly new, £29/10; Junior Model, 2-speed, £17/10.—H. Taylor and Co., Ltd., 21a, Store St., W.C. [X6307]

1917 4-5 h.p. Calthorpe-Jap, twin, 2-speed Enfield gear, chain drive, £63, cash; easy payments arranged.—Jones' Garage, Broadway, Muswell Hill, N.10. [X8065]

1 h.p. Calthorpe-Jap (Nov., 1916), Enfield 2-speed, 2 lamps, horn, spare belt and engine parts, as new; spares only; £30; no agents.—A. Henderson, 33, Oakwood Rd., Kentish Town, N.W.5. [X8660]

CALTHORPE.—1917 models in stock at P. J. Evans, 10, John Bright St., Birmingham, the Birmingham and Midland agent. Two-strokes, four-strokes, and 4-5 h.p. J.A.P. combinations, also ladies' models. [X8212]

CALTHORPES, 2 and 4-stroke models, with Enfield 2-speed, actually in stock, new and second-hand; prices to suit all pockets; only £2 extra for deferred payments.—William Whiteley, Ltd., Queen's Rd., W. [X8628]

## Campion.

CAMPION and Sidecar, Precision 4½ h.p., all chain, 2-speed countershaft; £50.—245-247, Euston Rd., W.1. [X8711]



## NEW MACHINES ACTUALLY IN STOCK.

NEW HUDSON, V.I.B., Model de Luxe, 4 h.p., 3-speed, de Luxe Sidecar ....	£84 18
MATCHLESS, War Model, 8 h.p. Combination, 3-speed, spare wheel .....	£120 0
ENFIELD, 1917, 2½ h.p., 2-speed, 2-stroke, 3 lamps, horn .....	£44 2
ENFIELD, 1917, 6 h.p., screen, lamps, horn ..	£120 0
HARLEY-DAVIDSON, 1917, mag. mod., with bulbous back H.-D. Sidecar ....	£130 0
HARLEY-DAVIDSON, 1917, mag. mod., with "B" H.-D. Sidecar .....	£130 0
HARLEY-DAVIDSON, electric model, with bulbous S-car, hood, screen, speedometer, quite like new .....	£140 0
ROVER, 1917, 3½ h.p., 3-sp. countershaft Combination, with Sidecar; present price £104/4/6. Our price .....	£99 4/6
ROVER, 1916, 3½ h.p., solo model, lamps and horn. Rare bargain .....	£68 10
AKIEL, 1917, 3½ h.p., 3-sp. Combination ..	£93 10
LEVIS, 1917, 2½ h.p., 2-speed, Model "E" ..	£47 10
LEVIS Popular Model .....	£32 0
CALTHORPE-J.A.P., 1917, 2½ h.p., 2-speed, Enfield gear .....	£39 16
ALLDAYS ALLON .....	£37 10
ROYAL RUBY, all models from .....	£32 10

## SECOND-HAND MACHINES.

ENFIELD, 1913, 6 h.p. coach Combination, nicely fitted up .....	£52 10
ENFIELD, 1916, 6 h.p. Combination, Lucas dynamo set, hood, screen .....	£110 0
ENFIELD, 1916, 6 h.p. Combination heap accessories, At order .....	£89 10
ENFIELD, 1914, 6 h.p. Combination, 3 lamps, horn, condition At .....	£68 10
ENFIELD, 1917, 6 h.p. Comb., every access. ..	—
ENFIELD, 1916, 6 h.p., dynamo equipped, hood, screen, spares, absolutely as new ..	£112 10
ENFIELD, 1915, 6 h.p. Combination, ridden about 2,500 miles .....	£84 0
TRIUMPH, 1913, 3½ h.p., 3-sp., s.T.T. bars ..	£32 10
TRIUMPH, 1916, 6 h.p., Sturmev-Archer gear, Sidecar, speedometer .....	£48 10
TRIUMPH, 1911, fixed gear mod., access. ..	£18 10
DOUGLAS, 1914, 2-sp. model, with accessories, ridden 500 miles .....	£45 0
HARLEY-DAVIDSON, 1915, magneto model, with Sidecar .....	£72 10
HARLEY-DAVIDSON, 1915, magneto model, and Sidecar .....	£58 10
HARLEY-DAVIDSON, 1916, electric model, and H.-D. "E" Sidecar, as new .....	£89 10
HARLEY-DAVIDSON, 1915, electric model, and Sidecar .....	£75 0
SINGER, 1913, 4½ h.p., 2-sp., countershaft, cane Sidecar, speedometer, lamps, horn ..	£35 0
ARIEL, 1915-16, 3½ h.p., countershaft Combination, k/st., speedometer, lamps, horn .....	£72 10
A.J.S., 1914, 6 h.p. Combination, 5 gn. speedometer, 3 lamps, horn, hood, screen ..	£77 10
CALTHORPE-J.A.P., 1915, 2-sp., lamps, horn, original tyres still on .....	£28 10
NEW HUDSON Combination, 3½ h.p. 2-sp. ..	£35 0
ALLDAYS ALLON, 1917, 2-sp., clutch model, accessories, as new .....	£43 0
CONNAUGHT, 1916, 2½ h.p., semi-T.T. bars ..	£22 10
LEVIS, No. 1, 1914, 2½ h.p., single-speed, fine condition .....	£23 10
B.S.A., 1913, with 3-sp. hub gear, Swan Sidecar, heap accessories .....	£42 0
B.S.A. Auto-wheel .....	£7 10
Also a 1917 Model .....	£10 10
P. & M., 1913, 3½ h.p., k-st., lamps, horn, T.T. bars .....	£12 12
P. & M., 1913, 3½ h.p., k-st., lamps, horn, T.T. bars .....	£31 10

PUSH CYCLE DEPT.—We have still an excellent assortment of Ladies' and Gents' Cycles in best makes: Ask for Lists.

**LAMB'S,**  
 151, HIGH ST.,  
 WALTHAMSTOW,  
 N.E.17.

Phone: Walthamstow 169.  
 5 minutes Hoe St. (O.E.R.).  
 25 minutes from Liverpool St. Station. Book to Hoe Street

Also at 50, HIGH RD.,  
 WOODGREEN, N.22  
 Only depot in this district.  
 Phone: Hornsey 1936.  
 Hours—9 to 8.  
 Thursdays, 1 o'clock.

## MOTOR CYCLES FOR SALE.

## Campion.

CAMPION, 1917, 8 h.p. twin, J.A.P., Jardine 4-speed gear box, fully equipped, indistinguishable from new; £90.—Percy and Co., 337, Euston Rd., London. [X7996]

1916 2½ h.p. Campion-Jap, 2-speed and free, equal to new, submit to mechanic's inspection, runs well on substitute, with Euk easy starter; £30.—Smith, Kildale Park, Smalley, Derby. [X6239]

## Chater-Lea.

CHATER-LEA, 8 h.p., 3-speed, chain drive, coach-built sidecar, all accessories, top-hole condition; £52; accept 2½ h.p. Douglas part exchange.—Douglas, 130a, Larkhall Lane, Clapham, S.W.4. [X6269]

## Chater-Lea-Rex.

BEST Offer.—6 h.p. Chater-Lea-Rex twin, free engine, hand controlled clutch, footboards, Bosch mag., in very good order, good tyres.—Parry, Chapel Lane, Chester. [X6283]

## Chater-Peugeot.

6 h.p. Twin Chater-Peugeot, Bosch, sidecar, new tyre, belt; £15; exchange.—143, Evington Rd., Leicester. [X6267]

## Clyno.

CLYNO 1914 6 h.p. Twin, 3-speed; £47.—65, Tooting Rec Rd., London, S.W. [X6259]

CLYNO 2-stroke, 2 speeds, and clutch, late 1914 perfect condition; exchange for Douglas, or sell £22 cash.—17, Dyers Lane, Putney, S.W. [X8742]

CLYNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham and Manchester; inclusive price with spare wheel, 100 gns. [X0884]

CLYNO, 1913-14, 5-6 h.p., 3-speed, and sidecar, P. and H. lamp set, Coway and horn, sidecar complete with spare wheel, £62; 1914-15, 3-speed, 5-6 h.p., and sidecar, £69; exchange or extended payments.—Service Co., 292, High Holborn, London. [X6339]

## Connaught.

CONNAUGHT, 1916, single speed, semi T.T. bars; really a bargain, £22/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [X8647]

CONNAUGHT, 1916, 2-stroke, complete with head lamp, generator, rear lamp, horn, etc., only done small mileage; bargain, £26.—Advertiser, 156, Gt. Portland St., W.1. [X8774]

CONNAUGHT Miniature, single speed, new, £33/17/6; ditto, 2-speed, £41/6/6; standard 2-speed, £44/9; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6341]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new; 42 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6340]

## De Dion.

31 h.p. De Dion-Bouton, good condition; trial; £9, or offer.—194, Shrewsbury Rd., East Ham. [X8601]

## Douglas.

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [X4749]

1915 Douglas, 3-speed, kick-start, in excellent condition; £38.—Walsall Garage, Walsall. [X5860]

DOUGLAS, 1914½, 2½ h.p., T.T., 2 speeds, long exhaust, knee-grips; £35.—109, Walton Rd., East Molesey. [X6326]

DOUGLAS, 4 h.p., 2-speed, kick start, sidecar, perfect; £72.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [X8409]

1916 W.D. Douglas, 2½ h.p., guaranteed perfect; any trial; £40.—Thompson, 408, Commercial Rd., Portsmouth. [X8709]

1916 4 h.p. Douglas Combination, fully equipped; £80, very cheap.—Colmore Depot, 31, Colmore Row, Birmingham. [X6321]

1915 Douglas, 2-speed, new tyres, lamps, petrol for 500 miles; guaranteed; £45.—Leeming, 2, Boot St., Burnley. [X8698]

DOUGLAS, 1915, Model W, 3-speed, clutch, tyres and machine excellent condition; £45.—James Moffat, Yeovil. [X8747]

DOUGLAS, 1914, T.T., lamps, Cover, new Dunlops, in nice condition; £35.—139, Beverstoe Rd., Thornton Heath. [X8749]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [X8855]

4 h.p. Douglas Combination, 2-speed gear, in splendid condition; £55, or exchange.—136, Lavenham Rd., Southfields, S.W.18. [X8766]

DOUGLAS, 2½ h.p., 1916, War Department model, excellent condition; £55; Yorkshire.—Box 1,286, c/o The Motor Cycle. [X6172]

DOUGLAS, 1914, 2½ h.p., 2 speeds, lamps and horn, excellent condition; £39/10.—Motor Exchange, Horton St., Halifax. [X8607]

COLMORE Depots, Birmingham, Manchester, and Liverpool, and Leicester, for earliest delivery of Douglas motor cycles. [X0800]



## MOTOR CYCLES FOR SALE.

## Douglas.

DOUGLAS, 1914 T.T. 2½ h.p., 2 speeds, excellent condition, numerous other machines in stock.—Griffin's, 89, Gt. Portland St., W.1. [8511]

LATE 1915 Colonial Model Douglas, 3 speeds, 2½ h.p., perfect condition: £45.—Poules, 49, Medway Rd., Roman Rd., London, E.3. [8570]

8 GALLONS Petrol and 1915 Douglas, 2½ h.p., 2-speed, perfect order, all accessories; must sell, bargain, £40.—33, Nicoll Rd., Willesden. [8782]

1915 Douglas, 2½ h.p., 3-speed, semi T.T., good condition: 39 gns.; coach sidcar for same, 6 gns.—Ward, 52, Nightingale Rd., Southsea. [8679]

1916 Douglas, 2½ h.p., 3-speed Colonial Model, good condition: £48; write appointment.—Rigby, 8, Morland Rd., Addiscombe, E. Croydon. [8562]

DOUGLAS, 1915, 3-speed Colonial model, fully equipped, good condition: £37/10.—Longman Bros., King St., Acton. Phone: 1578 Chiswick. [8686]

2½ h.p. Douglas, late 1915, 3-speed, and Watsonian sidcar, everything as new, done under 1,000 miles: £50.—Nixon, Brampton, Cumberland. [X6325]

DOUGLAS, 2½ h.p., 1914, 2-speed, T.T. bars, good tyres, head lamp, generator, very nice condition throughout: £35.—Advertiser, 156, Gt. Portland St., W.1. [8243]

1917 Douglas 4 h.p., Combination: 3-speed, free engine, outside dip feed; any trial: £77, no offers. Sainsbury, St. Quentin, Tangiers Rd., Copnor, Portsmouth. [8706]

DOUGLAS Motor Cycles.—We can deliver 1917 Model W on receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol (Wholesale and retail). [0923]

DOUGLAS, 1914, T.T., long exhaust, very fast, condition equal to new, P. and H. lamp set, Lucas horn, tyres nearly new: 34 gns.—15, Brushfield St., Bishopsgate, E.C. [8752]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 Douglas, 2½ h.p., 3-speed, 37 gns.; 1915 Douglas coachbuilt combination, 4 h.p., 3-speed, clutch, kick-start, 57 gns. (D) [X5976]

DOUGLAS, 1915, 2½ h.p., 2-speed, genuine T.T., speedometer, lamps, with Watsonian lightweight sidcar, and spare tyre, mechanically perfect: £52.—Evans, Woodcock Hill, Rickmansworth. [8658]

1915 4 h.p. Model B Douglas, 2-speed, clutch, kick-start, lighting set, 1917 Amac with hot air jacket for paraffin, equal to new, 48 gns., or offer.—Briscol, 56, Woodfield Rd., Ealing, W.5. [8721]

DOUGLAS, T.T., 2½ h.p., 1914, Lucas lamps, horn, speedometer, tools, absolutely as new, £40; Douglas 2½ h.p., 1913, just been enamelled and overhauled, lamps etc., £30.—Simister, Jordangate, Macclesfield. [X6256]

1915 Douglas, 3-speed Colonial Model, T.T. bars, rests, fitted Lucas lamps, Cowey speedometer, new belt, spare, tyres perfect, latest Douglas Amac, perfect mechanical condition: £39.—Tozer, Headlands, Kettering. [X6251]

1915 T.T. Douglas, £40, condition perfect, dynamo lighting set, Amac hot air carburettor, Pedley grips, knee pads, tools, etc.; would exchange for 4-5 h.p. Zenith combination.—Robshaw, 69, College Rd., Rotherham. [X6249]

DOUGLAS, 2½ h.p., 1914, 2 speeds, complete with lamps, horn, and good kit of tools, just re-enamelled, and in very good order and condition: £37/10; extended payments arranged.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [8719]

DOUGLAS, 2½ h.p., July, 1916, 3-speed, semi T.T., Lucas lighting set, mechanical horn, complete tool kit, heavy overalls, insurance policy (9 months unexpired), condition throughout absolutely as new: £48/15 cash, no offers.—George Rogers, Feathers Hotel, Warrington. [X6281]

2½ h.p. Douglas, absolutely new: immediate delivery of 24 models U, V, and W, clutch, kick-start, against priority permits, for doctors, farmers, war and munition workers. Write to Douglas Specialists, Robinson's Garage, Greco St., Cambridge. [8597]

## Edmund.

EDMUNDS (new), 2½ h.p., J.A.P. Royal Enfield 2-speed, spring frame, double tank, strongly-built machine: £54/12/6; extended payments arranged.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [8717]

## Enfield.

ENFIELD Combinations, latest models: £94/10; delivery from stock.—Below.

ENFIELD 3 h.p. Two: £57/10; and 2½ h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838]

1914 Enfield, 3 h.p., new condition; a bargain, £26.—Ross, 86, High Rd., Lee. [8732]

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801]

ENFIELD Motor Cycles.—Prompt delivery all models.—P. J. Evans, John Bright St., Birmingham. [8213]

ENFIELD, 2½ h.p., 2 speeds, very good condition, many others.—Griffin's, 89, Gt. Portland St., W.1. [8512]

ENFIELD 1913 Combination, new tyres, beautiful turnout: £38.—51, Maplethorpe Rd., Tlinton Heath. [8663]



## SIDECAR COMBINATIONS.

DOUGLAS, 4 h.p., 1915, 3-speed Combination, 3 lamps, horn, speedometer ..... £66  
 INDIAN, 7-9 h.p., 1915, 3-speed, spring frame, Millford Sidecar to match, all accessories ... £55  
 CLYNO, 6 h.p., 1914, khaki finish, detachable wheels, 3-speed ..... £85  
 EXCELSIOR, 8-10 h.p., 1915, 3-speed, coachbuilt Sidecar, electric lighting ..... £48  
 HUMBER, 8-10 h.p., 3-speed, handle starting, coachbuilt Sidecar, all accessories ..... —  
 J.H., 8 h.p. M.A.G. engine, Millford Sidecar ... £80

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 RUDGE, 1912, 3½ h.p., fixed gear; very fast. ... £21  
 CATHORPE, 1915, 2-speed, 2-stroke, adjusted to run on paraffin ..... £22  
 ALLDAYS MATCHLESS, 2½ h.p., 2-speed, 2-stroke, requires assembling ..... £15

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## OTHER MACHINES.

Matchless and almost new Bramble mechanical, fine lot, good order, mechanical horn, good lamp set ..... £42 10  
 1913 Clyno, C.B.S./car, lamps, etc. ..... £35 0  
 Ariel, 3½ h.p., fine order, new tyres ..... £25 0  
 1913 Humber, two-sp., good order ..... £15 0  
 1912 Abingdon, s-sp., T.T. bars ..... £10 10  
 Rex-Jap, 6 h.p., Sidecar ..... £10 10

Near offer.

37, Turnham  
Green Terrace  
near Turnham  
Green Station,  
LONDON, W.



## MOTOR CYCLES FOR SALE.

## Enfield.

8 h.p. ENFIELD Combination, late 1915, complete fittings, spares: £70.—10, Gaveston Rd., Leamington. [X6060]

ENFIELD, this year's, but slightly used, indistinguishable from new.—Colmore Depot, 31, Colmore Row, Birmingham. [X6320]

ENFIELD 1913 6 h.p. Combination, all accessories, excellent condition: £60; Yorkshire.—Box 1,287, c/o The Motor Cycle. [X6173]

1916 Enfield Combination, practically new, lamps, speedometer, etc.; must sell: £75.—Tippett, Arlington Rd., Surbiton. [8699]

1916 Enfield 6 h.p. 2-speed Combination, splendid condition, small mileage; bargain, £72/15s.—Howe, High St., Nuneaton. [X6295]

6 h.p. Enfield Combination, fullest equipment, low mileage, condition as new: £68, quick sale.—Thorpe, Whitehorse Rd., Thornton Heath. [8768]

1917 6 h.p. Royal Enfield Combination, latest pattern, equal to new, complete with lamps, tools, etc.: 80 gns.—Box 1,291, c/o The Motor Cycle. [X6220]

ENFIELD, 1912, 2½ h.p., 2-speed, free, toothboard, lamp, generator, spare chains, re-enamelled April, bargain, 20 gns.; photo.—Gilton House, Grenville Rd., Braintree. [8667]

1916 Enfield Combination, perfect condition, screen, pillion seat, speedometer, and good spares, with petrol: £85.—H. W. Smith, 53, Lamouth Palace Rd., Westminster. [8656]

LATE 1916 6 h.p. Enfield Combination, had little use, perfect condition throughout, speedometer, tools, etc.; any trial; best offer over £75.—Taylor, 149, Bally Rd., Doncaster. [X6271]

1915 Enfield, 3 h.p., T.T. bars, electric also acetylene lamps, knee grips, mechanical horn, absolutely as new: £42.—Elice and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [0551]

ENFIELD, 6 h.p., late 1914, 2-speed, handle starter, good tyres, coachbuilt sidecar, head lamp, generator, rear lamp, fully equipped, and perfect throughout; bargain, £65. Below.

ENFIELD, 2½ h.p., 1914, 2-speed, kick starter, all chain drive, Enfield grey, good tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout; bargain, £34.—Mebeas and Mebeas, 156, Gt. Portland St., W.1. [7261]

ENFIELD Combination, 6 h.p., fitted with Lucas electric lighting set and horn, speedometer, hood, screen, and luggage carrier, splendid condition; any trial; £85, no offers.—Box 1,284, c/o The Motor Cycle. [X6081]

1914 Enfield Combination, 6 h.p., 2 speeds, handle starter, tyres almost new, lamps and horn, in splendid running order, too powerful for owner: £52, or exchange for 4 h.p.—Supt., Children's Home, Bulborough, York. [X6364]

ENFIELD 6 h.p. 1916 Combination, Palmer cord light car tyres all round, large head lamp, generator, rear lamp, luggage carrier to sidecar, very nice condition throughout, and fully equipped: £90.—Advertiser, 156, Gt. Portland St., W.1. [7904]

ENFIELD 1915 Combination, 6 h.p., 2-speed, clutch, Thompson-Bennett mag., Amac carburettor, fitted with lamps, Stewart speedometer, and horn, £87/10; 2½ h.p. 2-speed, £20; E.P. or exchange.—Service Co., 292, High Holborn, London. [X6342]

ENFIELD, June, 1917, 6 h.p. combination, Palmer cord light car tyres, lamps, horn, speedometer, clock, reflector, spare tube, luggage grid, fitted with box for spare petrol, handle starter, insurance policy, condition as new: £115.—Major Sawyer, R.A., Royal Albert Hospital, Walsley. [8563]

ENFIELD, 3 h.p., late 1914, T.T. Model, with roadster mudguards and handle-bars, tyres almost new, Roman rims and rustless spokes, just been overhauled, everything in first-class condition, 130 m.p.g., has been carefully used and well looked after: £36.—Box 1,289, c/o The Motor Cycle. [X6359]

TWIN Enfield, 1916, 3 h.p., with Canelet sporting sidecar, and complete with lamps, horn, sidecar apron, and tools, in splendid condition and appearance almost like new: £55; extended payments arranged.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [8720]

ENFIELD 1915 6 h.p. Combination, speedometer and electric lights, engine, speed gear, wheels, and bearings perfect, been overhauled throughout recently, repainted by coachbuilder, done 200 miles in last 12 months, improvements everywhere, spares: absolute bargain, £68; only wants seeing.—Pollard, Yoteley Lodge Cottage, near Cambridge. [8746]

ENFIELD, 1917 6 h.p. standard model, hood, screen, 5 Lucas lamps and horn, new, £120; also 1917 2½ h.p., 2-speed, new, £44/2; also 1916 very late 6 h.p. dynamo combination, hood, screen, speedometer, like new, £112/10; also another 1916 6 h.p. dynamo outfit, fully equipped, but not quite such good looking exterior, £110; also 1915 6 h.p. combination, with accessories, £84; 1914 6 h.p. combination, condition like 1917, £68/10; also another 1916 standard model, with hood and screen; exchanges, easy payments.—Lums, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8645]

## Excelsior.

EXCELSIOR, 2½ h.p., 2-speed, new: £44.—H. Tavak and Co., Ltd., 21a, Store St., W.C. [X6306]

42 1 h.p. Excelsior, with sidecar, late 1913; bargain: £37/10.—Manager, Bank, Festiniog. [8602]



# THE MOTORCYCLE

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## Flying Facts and Theories.

**A**LL our regular readers know that *The Motor Cycle* has from the first recognised the great influence which aeronautical engine practice is likely to have upon the motor cycle of the future. Early in 1916 we published a series of articles dealing with many points where the rapid development of the aeroplane would probably prove beneficial to the humbler mount, and this series has been followed from time to time by other articles of a similar nature. Now, however, we propose to go still further in the matter, having in mind the fact that most of our best pilots, if not all, have been, and possibly are, still motor cyclists, and many motor cyclists are pilots in embryo; therefore this issue contains the first of a new series of articles, in which will be discussed not only the aero engine, but also the aeroplane itself. Information of a most interesting nature will be provided concerning problems of design and construction. Further, many phenomena encountered in the air will be explained in a manner which can be readily understood.

## The Best Type of Pilot.

**I**N a very able article in a daily newspaper, Mr. H. G. Wells has pointed out the supreme importance of our getting hold of, and training, the class of men who will make the best pilots, because, however good our machines may be, it is always necessary that they should be managed by the most daring and skilled men, well cut out for the work.

Mr. Wells points out that "the first-class air fighter must be capable of the most amazing tricks. He has not only to loop the loop, but to fly sideways, fly upside down, sideslip, drop, dodge, and double in a fashion that no one would have dreamed of in 1914."

It is certainly the young man who has ridden a motor bicycle with skill and daring who is going to do these tricks in the air, but how are we to train the younger generation if we are to

prevent him from getting fuel on which to run his machine? No one is so foolish as to hope that the Government will allow motorists petrol when there is not enough to go round, and there is no patriotic motorist who would not go without gladly rather than that the Navy, Army, and Government Departments should go short; but we veritably believe that there is enough for everybody, and if there is a little to spare let the private motorist have that little.

## Clutch Models.

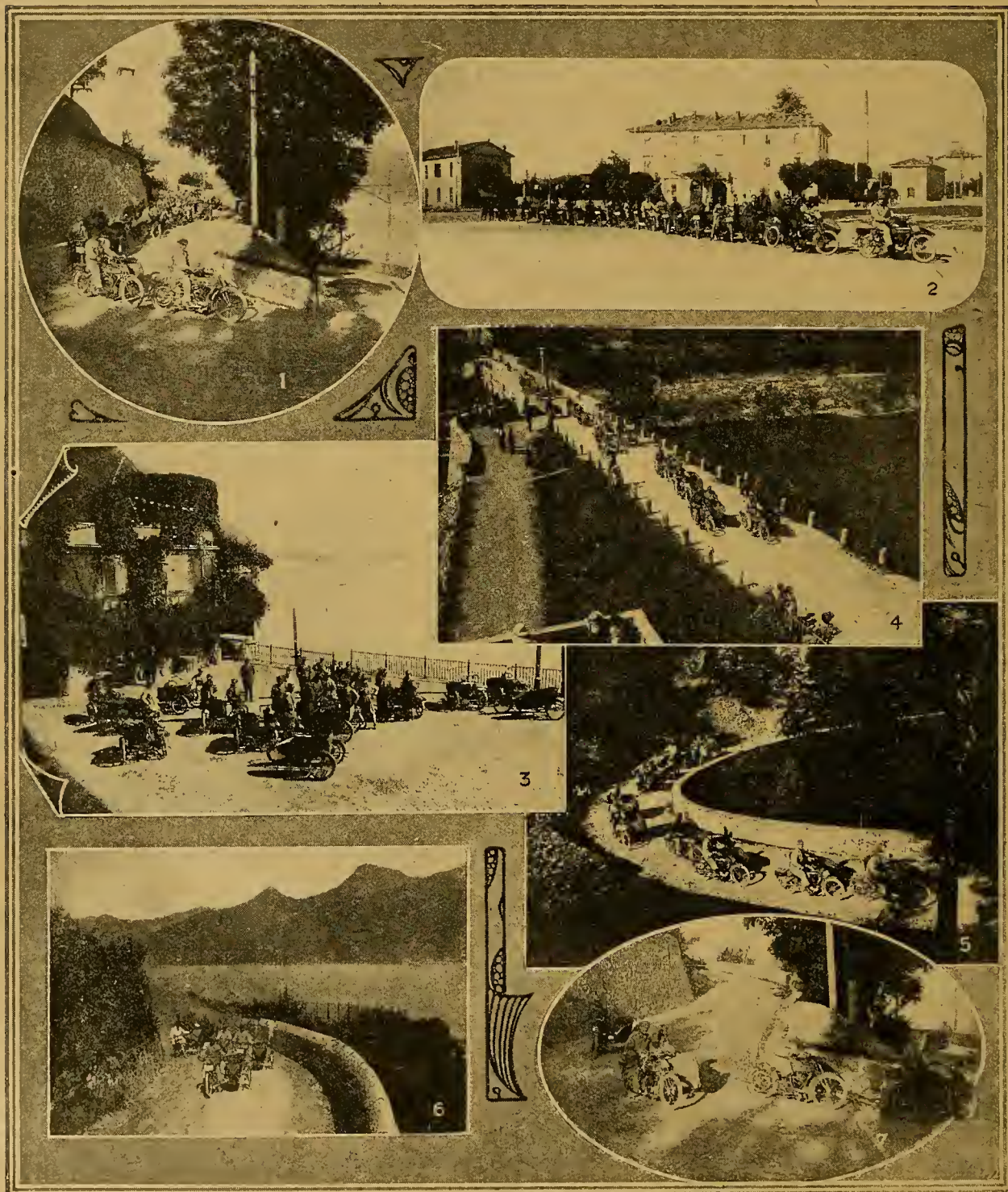
**A** WRITER in this issue refers to the possibilities of the light clutch model, solo mount, and we heartily endorse what he says as regards the desirability of this type of simplicity machine. A gear box, with its necessary components, adds very considerably to the clumsiness of a machine designed simply and solely for solo use, whereas a highly efficient countershaft clutch, which can be notched to act as a shock absorber when occasions demand, would detract little from the general handiness, and in conjunction with a good engine would fulfil most of the conditions of touring.

The featherweight two-speed gear would, perhaps, be regarded as preferable by most riders, as one has then an emergency ratio to fall back on in cases of extremity, but such a fitment must be fairly weighty, and to obtain really good control a clutch is necessary in addition. A really efficient clutch with no gears is in many cases preferable to a two-speed pinion gear with no clutch, as given a good engine, one very seldom needs the low gear, whereas the demand for a clutch is persistent. On present two-speed clutchless models many riders attempt to use the gear box as a clutch, with the result that gear troubles are not unknown. A good clutch, on the other hand, cannot very well be damaged, and we would certainly recommend manufacturers who are interested in purely solo mounts of the simplicity type to contemplate the possibilities of this system.



## Testing Italian Military Motor Cycles.

The course taken—approximately one hundred miles—was from Milan up to the famous Lake Como, then up Lanzo d'Intelvi, a hill of approximately seven miles of 1 in 5.2. The machines shown are 6-8 h.p. Stucchis.



(1) Hairpin bend on the Lanzo d'Intelvi road. (2) First half of the batch of Stucchi motor cycles undergoing tests on the outskirts of Como. (3) Cooling down beside Lake Como before ascending to Lanzo d'Intelvi hill. (4) Starting the ascent of the hill. (5) A bad bend on the Lanzo d'Intelvi road. (6) One of the steepest portions of the hill a few hundred yards after the start, with Lake Como in the background. (7) A bad hairpin bend.



# Occasional Comments by "Ixion"



## Three-wheelers.

**L**ANCE-CORPORAL COMMON will have many sympathisers in his plea for the homogeneous three-wheeler, not least of all myself, who parted company with the sidecar quite early in its history, and have ever since refused to be charmed back to it. He perhaps forgets that the sidecar is a two-tracker, and, as such, appreciably more comfortable over rough going than his beloved three-trackers, also that it will turn in a much narrower circle. On the other hand, it is not an ideal mount when the chair is empty. Still, I hope to see light, cheap, four-wheelers knock out all the three-wheelers some day. It is a curious thing that nobody has yet taken up the manufacture of inexpensive cycle cars on the grand scale. To the best of my belief nobody has ever even contemplated it. What a *furor* there would be if at the conclusion of the war one of our leading firms, e.g., the Triumph Co., were to take the front page of half a dozen big dailies one fine morning and announce that in a month it was prepared to deliver a £100 four-wheeled cycle car, appending full particulars of its design, petrol consumption, speed, etc.

## Financially—?

**T**HE financial aspects come first and are hard to estimate, simply because we are ignorant of the peace terms, of post-war trade, and of post-war taxation. In the past the middle classes have been the chief purchasers of the less expensive luxuries, such as motor cycles. After the war the redistribution of wealth may conceivably take the form of impoverishing the middle classes for the benefit of the so-called working classes and plutocrats. In that case, the old market for cheap motors will shrink, and a new market may not emerge very rapidly. But it is humanly certain that there will be a good enough market to justify any programme of which our rather lethargic and unimaginative manufacturers are capable.

## And Technically—?

**T**HE main technical proviso is that it is absolutely useless to tackle a cycle car programme in penny numbers. Previous booms have been too largely based on small back street workshops, which bought their engines and all the other unit components, invested in a score of workmen and a few hundred feet of tube, and glued the lot together at the rate of one a fortnight. I once met a brilliant engineer whose one ambition was to become a successful motor cycle manufacturer. It was in that brief period when everybody was buying motor cycles, and the public ear had not been attuned to hear none but the famous names. You could sell any local transfer machine provided it had a decent engine. "Why," I enquired, "do you insist on making your own engines? Put your pride in your pocket, buy J.A.P. engines for two years, and get a local reputation. Then, if you like, bring out your own engine, which is undoubtedly a

good one, but unknown." He replied, sadly, that he wished he could afford to buy his engines, and he showed me the money he saved by making them, though "making" meant little more than machining up parts in his case. The cycle car's success or failure is very largely a question of £ s. d., and I do not expect it to make good until some statesmanlike firm take the trouble to perfect an experimental model and then deliberately plan a gigantic output. They need not be anxious about sales. If the stuff is sound and the price is right we shall all tumble over each other to get delivery. But the price will never be right when the so-called manufacturer is paying a 25% profit to an engine maker, ditto to a gear cutter, ditto to a frame builder, ditto to an axle maker, and so on. You have only to put a Ford car alongside a British sidecar outfit at the same figure to recognise how intimately the scale and method of production are associated with value for money. If Fords were built in back streets of bought bits at the rate of rather a dubious one per week they would cost about £400 apiece, and it is small wonder, air-cooling problems omitted, that we have muddled every cycle car effort we have ever made. Now that air-cooling bids fair to be feasible, it is high time that a syndicate got an option on one of the huge munition shops which will be going begging in umpteen months (?) or years (?) and contemplated cycle car production on a scale which would justify booking the front page of the *Daily Mail* once a week for a year.

## A Miraculous Plug.

**A**S I have never hesitated to tell the worst I knew of sparking plugs, I print the following at its face value for discussion by our readers. It is from a veterinary surgeon:

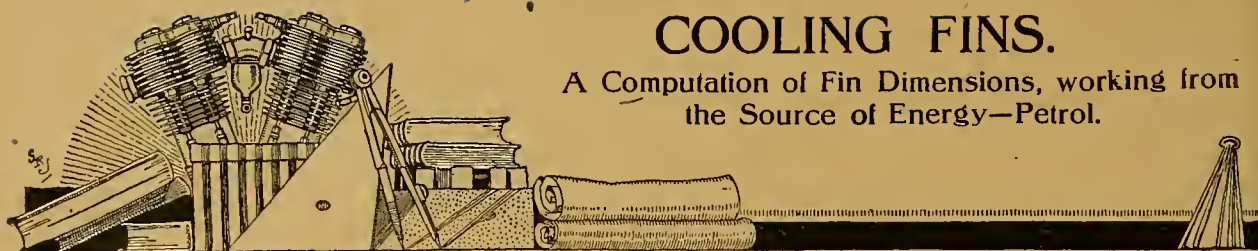
"Eighteen months ago I purchased a 6 h.p. Sparkbrook combination, which I use in my professional duties. It ran beautifully up to 38 m.p.h., which was later increased to 43 m.p.h. by fitting a Binks carburetter. I was convinced it could do better, and tried in all twenty-six different sparking plugs until the Sphinx Co. sold me two of their Mark C25. Their first trial trip with a dirty engine produced 52 m.p.h. per speedometer, and after a clean and tune up I got 58 m.p.h. with a 16 stone passenger. After nine months' work I returned the plugs to the Sphinx Co. for a clean and overhaul. When I want to clean them for myself I place them on the gas stove with a tin over them, get them red hot, allow them to cool, and brush them out in the usual way."

I do not say that the above conclusions are mistaken, for I have certainly met plugs which caused pre-ignition and misfiring long before an engine had reached its full rate of r.p.m. But it seems probable that some other adjustment was unconsciously made by the owner about the time the new plugs were first fitted. It would be interesting to hear full technical details of the new Sphinx plug.



## COOLING FINNS.

A Computation of Fin Dimensions, working from the Source of Energy—Petrol.



IN introducing this subject we must first be quite clear on the actual function of the fins as applied to air-cooled engines. It is a common term and an equally common fallacy to designate these as "radiating fins" because the part actually played by radiation amounts to only six or seven per cent. of the total heat supplied to the engine. The real purpose of these fins is to receive as much heat as possible from the inner cylinder wall by conduction, and then transfer this heat to the current of air which is passed or driven through the intervening spaces between the fins.

In attempting to make calculations in such a complex problem it is absolutely necessary to make a great many assumptions,

.5in. apart (they are .5in. on the writer's engine), and are fourteen in number on the wall and four on the head.

It is now necessary to find the depth ( $h$ ) of the fin which will provide sufficient area of cross-section in order to transfer the necessary heat to the current of air.

If we take the average performance of a  $3\frac{1}{2}$  h.p. machine with a good load we find there is a consumption of 65 miles per gallon, and an average speed of 25 miles per hour, so from this we can find the quantity of fuel used over a unit of time (in this case we can conveniently take one hour). A consumption of 65 m.p.g. at the rate of 25 m.p.h. gives  $65 \div 25$  hours for consumption of one gallon, *i.e.*, 2.6 hours.

Now the calorific value of motor spirit = 20,730 B.Th.U.'s per lb., and its specific gravity = .80.

1 lb. of water represents .1 gal.

$\therefore$  1 lb. of spirit represents  $\frac{1}{.8} = .125$  gal.

*i.e.*, .125 gal. contains 20,730 B.Th.U.'s.

$\therefore$  1 gal. contains  $\frac{20,730}{.125} = 166,000$  B.Th.U.'s.

$\therefore$  In 2.6 hours the consumption represents 166,000 B.Th.U.'s, *i.e.*, in one hour the consumption represents  $\frac{166,000}{2.6} = 64,000$  B.Th.U.'s. This figure is the quantity of heat units given to the engine cylinder every hour under average working conditions.

### Heat Losses.

We are now able to split up this quantity into the various sources of expenditure, thus:

1. Energy required in doing the work of propulsion.
2. Heat lost through exhaust.
3. Radiation.
4. Heat lost through the medium of cylinder wall and head.

Dealing with 1, we get

$$\begin{aligned} 3\frac{1}{2} \text{ h.p.} &= 3.5 \times 33,000 \text{ ft. lbs. per min.} \\ &= 3.5 \times 33,000 \times 60 \text{ ft. lbs. per hour.} \\ &= 6,930,000 \text{ ft. lbs. per hour.} \end{aligned}$$

Now 1 B.Th.U. = 778 ft. lbs. =  $\frac{6,930,000}{778}$  B.Th.U.'s,

*i.e.* heat equivalent of actual work done = 8,900 B.Th.U.'s.

2. It is found from experiments that approximately 70% of the total heat is taken away in the exhaust gases, representing  $\frac{70}{100} \times 64,000 = 44,800$  B.Th.U.'s.

3. F. W. Lanchester, in an address at a meeting of the Institution of Automobile Engineers, calculated this loss by radiation as being 5% of the total heat;

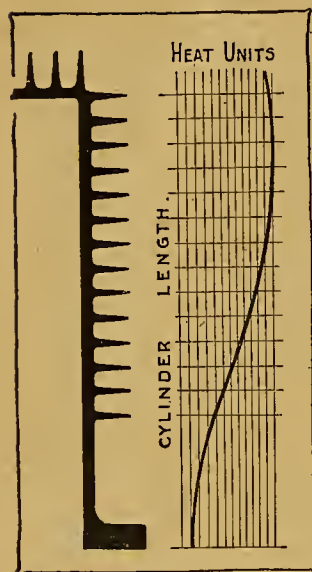


Fig. 1.

The actual conditions may be represented by a graph indicating the disposition of heat over the length of the cylinder wall.

based mainly on practical experience.

(1.) That the distribution of heat over the length of the cylinder wall is uniform (see fig. 1).

(2.) That the distribution of heat over the fin surface is uniform—there is actually a temperature gradient over the depth ( $h$ ) of the fin, due to its shape and conductivity (see fig. 2).

(3.) That the space between the fins is large enough to pass the requisite quantity of air without the latter being heated to such a degree that it will not receive heat from the fins.

As our example, let us take the  $3\frac{1}{2}$  h.p. engine with a bore of 85 mm. and assume that the fins are spaced

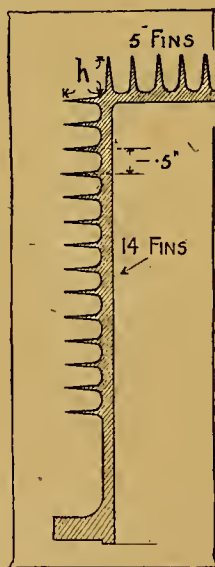


Fig. 2.

Section of the cylinder taken as an example.



**Cooling Fins.—**

but it has since been estimated as being between 6% and 7%, thus representing an amount equal to

$$6/100 \times 64,000 = 3,840 \text{ B.Th.U.'s.}$$

Adding 1, 2, and 3, we get 8,900

$$44,800$$

$$3,840$$

$$57,540 \text{ B.Th.U.'s,}$$

which leaves  $64,000 - 57,540 = 6,460$  B.Th.U.'s to be dissipated by means of cooling. If this be so, we may now say that the heat given out by the cooling fins must be equal to the heat gained by the current of air passing through them.

The next step will be to calculate the quantity of air passing in the unit of time (one hour).

Cross sectional area of air space between fins

$$= h \times .5 \times 30 \text{ (No. of spaces)} = 15 \text{ h. sq. ins.}$$

$\therefore$  Cu. ft. per hour (assuming machine to be travelling at 25 m.p.h.)

$$= \frac{15h}{144} \times 25 \times 1,760 \times 3 = h \times 13,750 \text{ cu. ft./hours.}$$

Now the density of air at  $62^\circ \text{ F.} = .076 \text{ lb. per cu. ft.}$

$$\therefore \text{Wt. of air passing} = h \times 13,750 \times .076$$

$$= 1,045 \text{ h. lbs.}$$

Another important but fair assumption will have to be made, and that is the temperature rise of the air before and after entering the fins.

This is usually taken as  $8^\circ \text{ F.}$

The air will then possess  $1,045h \times 8 = 8,360$  B.Th.U.'s.

Then

$$\begin{array}{ccc} 6,460 & = & 8,360 h. \\ \text{heat to be} & & \text{heat received} \\ \text{dissipated.} & & \text{by air.} \end{array}$$

$$\therefore h = .73''$$

To deal with the subject of cooling, and especially air cooling, would be too vast to attempt any thorough investigation here, but, treating it in a very broad manner as has been done, shows that there is a very close relation between the result obtained—.73", nearly threequarters of an inch—and the fins of the present-day engines.

It is really a wonder that this question has not brought about a great deal of controversy in the motor cycling press, as the matter is one of vital importance if one may judge from the topics in your Query columns. Of course, much depends upon the driver of the machine, but nevertheless this subject of cooling has not received the attention and investigation that so important a subject undoubtedly deserves. H.

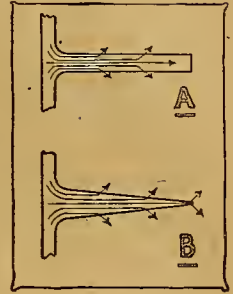


Fig. 3.

A and B represent the distribution of heat in two types of fins. It will be seen in A that the heat to be dissipated is more or less confined to the inner surface of the fin, and so comes into contact with only a portion of the air passing through. B shows the correct form of fin (as in our present engines) where the heat is dissipated uniformly over the surface.

## Petrol and Coal Gas Compared.

THE following notes may be interesting both to those who do and those who do not contemplate attaching gas bags to their road dirigibles.

**Coal Gas.**—The average calorific value of one cubic foot of coal gas taken over the five largest towns in England was, before the war, about 660 B.Th.U.

**Petrol.**—In round figures, the calorific value of 1 lb. of petrol is 20,000 B.Th.U. Assuming a gallon of petrol to weigh 7.3 lb. we have  $7.3 \times 20,000 = 146,000$  B.Th.U. in a gallon of petrol.

$\therefore$  No. of cubic feet of coal gas to equal one gallon of

$$\text{petrol} = \frac{146,000}{660} = 220 \text{ cubic feet, which agrees}$$

pretty well with figures quoted in the press.

In a test of a small gas engine it was found that the best result was obtained with a ratio of air to gas of 8.6 to 1, so that the total volume of mixture needed to get maximum power out of 220 cubic feet of gas =  $(8.6 \times 220) + 220 = 2,112$  cubic feet.

Similarly, in a petrol engine the maximum power was obtained when 220 cubic feet of air were used per lb. of petrol, or when  $7.3 \times 220 = 1,600$  cubic feet used per gallon. Allowing 30 cubic feet for the volume of the gallon of petrol when converted into vapour we have 1,630 cubic feet of mixture per gallon. Comparing these figures, 2,112 cubic feet of coal gas mixture and 1,630 cubic feet of petrol vapour mixture, it is evident that if a petrol engine is run on coal gas it will develop stroke for stroke only about 77% of the power that it will on petrol. And to do this the

compression of the engine would have to be raised so that initial compression in the case of coal gas was about one atmosphere higher than is usual in a petrol engine.

Though it may be found convenient in odd cases to use coal gas, it is not likely that it will be much used by private riders. Indeed if some method were suddenly to be devised, there is little doubt that the authorities would step in and prohibit it.

Consider for a moment what the owner of a modest sidecar is up against should he desire to run his machine on coal gas. Suppose his gas holder to be carried in a light square frame for neatness and protection. It is hardly likely that this frame would exceed 2ft. 6in.  $\times$  2ft. 6in.  $\times$  5ft. in size, or, say, 31 cubic feet maximum capacity of holder. This is equivalent to about one-seventh of a gallon of petrol. He might be able to do ten miles. For running a matter of five or six miles to business and back, if there are proper conveniences for filling the holder at each end, a gas bag installation may appeal to some. It is to be noted, however, that in nearly all the large towns the Gas Committees have already had under consideration the question of the use of coal gas for driving motors, and have prohibited the use of gas taken through ordinary meters for this purpose. Special charging stations are to be arranged for. This destroys at once one of the attractions of coal gas so often dilated upon, viz., "you can fill your gas bag at your own tap."

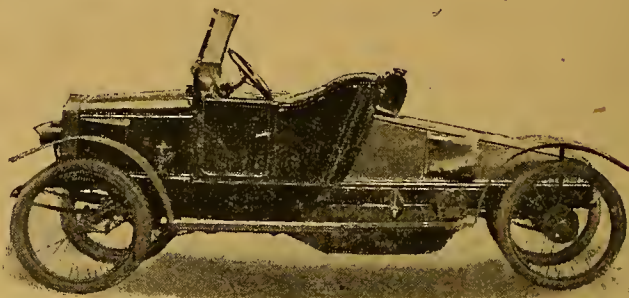
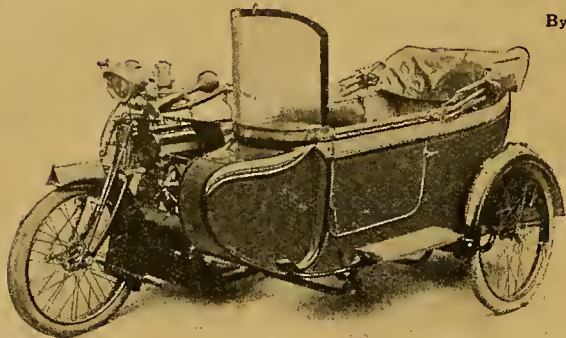
ENGRO.



## THE LUXURIOUS SIDECAR OUTFIT.

Points which should be Tackled by Manufacturers.

By "ROAD RIDER."



The type of luxurious combination which even before the war would cost well over £100, especially if equipped with dynamo lighting, as many of the sidecars are to-day.

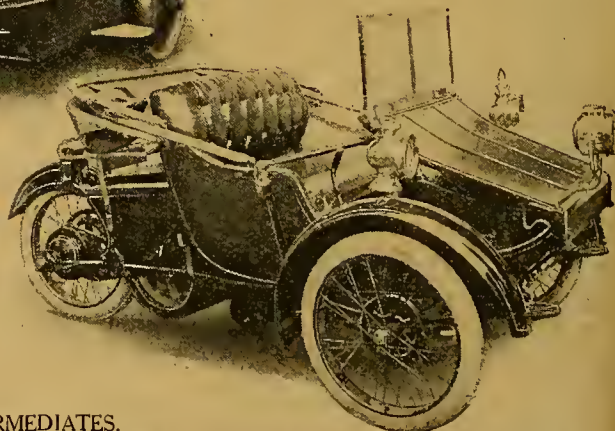
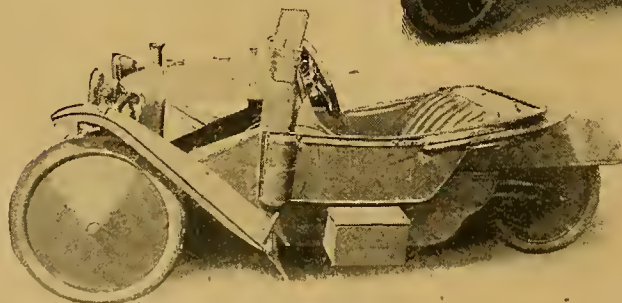
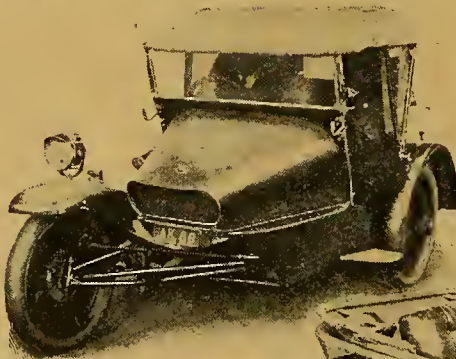
**A**N officer recently wrote very plausibly in our columns on the unquestionable attraction which the high-class sidecar outfit has for so many of us. He rightly identified cheapness of maintenance and speed as the basis of its popularity, and was impartial enough to admit noise, the exposure of the driver, and the labour of cleaning as its most staring defects. I pay no attention to his complaints about scanty luggage accommodation and tyre repairs, as both are out of date. The former is applicable, in proportion to any but the biggest car, and the latter is practically eliminated by the modern detachable wheel. Noise can be solved any day the makers like to tackle it so far as mere exhaust uproar or mechanical clatter is concerned, and this count in the indictment may therefore be ignored. The exposure of the driver is insoluble, unless we switch over to the Scott Sociable type; for, when all is said and done, there will remain a huge difference between sitting on a cushion under a hood, behind a glass screen, and sitting on a saddle out in the open. Mud may be trapped, head draughts may be scotched, but the genuine sidecar outfit will always mean a great measure of exposure for the driver, and it can only appeal to people who

A 1912-13 G.W.K., the type to which "Road Rider" refers in speaking of the respective prices of the luxurious sidecars and second-hand light cars.

rather enjoy exposure, when they are appropriately clad, or to people who cannot afford to buy the fuller protection after which they secretly hanker. The labour of cleaning might conceivably be appreciably reduced, but probably at some cost to accessibility, and here I reach the point at which I desire to extend "Officer's" appeal to designers.

### Petty Troubles.

One of the worst points of the sidecar outfit, even of the highest class, is its low reliability standard. I speak comparatively, of course. It almost always gets you there and back again, except in big trials, where the freak going is apt to strain or fracture something. But my experience is that the sidecar outfit suffers appreciably more from petty troubles than the solo motor cycle or the small car. Not so very long ago a country doctor asked my advice. He was doing his rounds on a cheap foreign car, and his trouble was that when it let him down he had nothing in reserve but a bicycle for very long trips in hilly country and a bad climate. I



### THE INTERMEDIATES.

The lower photographs, a Morgan and an A.C. Sociable, are types of three-wheelers which have stood years of testing, and proved themselves as reliable as the sidecar or car. The upper three-wheeler is the Scott Sociable, a newcomer to the ranks of three-wheeled vehicles, and fully described in past issues of *The Motor Cycle*.



**The Luxurious Sidecar Outfit.—**

suggested two first-class sidecar outfits, and he bought them. When one gives trouble he has the other in reserve, and the united running costs are not materially higher than those of the somewhat indifferent imported car which he used to run. But he says quite plainly that he preferred the car, and though he mentions the points which "Officer" selects for criticism, his main complaint is "there is always some potty little thing to be done to the cycles when they come in." In cross-examination, I formed the opinion that this want of detail reliability was due to vibration; it would hardly arise if the outfit possessed a decently balanced engine and a spring frame. But it has a rigid rear frame, an ordinary spring fork, and an engine which puts the whole machine in a dither when it is accelerated a little for an uphill start, or revved freely on low gear. A sprung frame and a flat twin or four-cylinder engine are the indicated cures.

**Noisy in Free Engine.**

"Officer" further omits a feature which explains many people's distaste for motor cycles in general. Their behaviour is so vulgar when they are stationary with the engine running light. They make far too much noise under these conditions, and they shake. We do not realise it until we handle a car; but no car which created half the pother of a stationary motor cycle would have a chance to sell. The cure is as indicated above, coupled with a slight modification in engine design. In the old days we never ran our engines declutched. Few of us had clutches, and those who had did not yearn to seize their pistons or do in an exhaust valve. When modern specifications came along makers never tumbled to the fact that the average motor cycle is a disgrace when it is running free. Solo machines need not be run free, but sidecar

outfits must be, and even with expert tuning and expert handling they are poor at the game. At the last Olympia Show I saw one of the smartest men in the trade demonstrating these aspects of his new model, and every passer-by who did not happen to be a motor cyclist gave him a glance of amused contempt. So little do we understand what real public opinion in this matter is. If the above points are properly tackled we can almost ignore accessibility. But at present the simple truth is that the type of motor which gives the maximum of petty troubles is the least accessible.

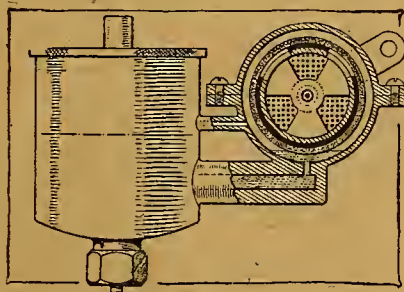
**Accessibility.**

No high-powered twin can be called accessible in the sense in which the owner of a car or of a 3½ h.p. solo or a baby two-stroke uses the term. It is the main penalty of an 8 h.p. machine that you have the maximum of bulky mechanism crammed into the minimum of space. You must also squat or kneel to get at it—a disadvantage which it shares with the solo bicycle, but not with the car. You further have the sidecar crowding up one side of the machine, a fault which the outfit shares with nothing else on earth. Only the closest study can minimise this last trouble. Until the limit of accessibility and reliability has been imparted it is sheer folly to talk of improving the weather protection. In all these matters there is plenty for the trade to do if it wishes to preserve a type of machine which has several intrinsic and peculiar merits. Before the war one could buy second-hand cars, like the G.W.K., for instance, at about the same figure as a new sidecar outfit. Any price variations will hit both ways with equal force after the war. The cheap car will unquestionably be infinitely better than it used to be, and in its second-hand phase will be increasingly attractive; and it is by no means so easily outpaced by the 8 h.p. sidecar as "Officer" thinks.

## Another Wick Carburetter.

**I**N our issue of August 30th we illustrated a simple wick carburetter, the invention of W. A. Fitch, which has resulted in bringing before our notice of an instrument of very similar design, patent No. 14,026J/13, owned by R. Shearn, of Flint.

The working principle of the Shearn wick carburetter is practically the same as the one already described, as shown by the accompanying drawing, and the inventor expresses the opinion that it probably anticipates Mr. Fitch's design. It is entirely automatic, the opening and closing of the throttle governing not only the amount of wick exposed, but regulating the air supply also, while an adjustable fixed air supply is also provided. The maker claims to have obtained excellent results from his experimental model, which is fitted to a 4¼ h.p. single-cylinder sidecar machine, geared 4¾ to 1. He asserts that the engine will run well on paraffin without heating of the carburetter, and that it is only necessary to inject a little petrol on to the wick in order to start. Another claim he makes is



The Shearn carburetter, a patented wick pattern, embodying several ingenious ideas.

that knocking never occurs with this carburetter, it being impossible to cause knocking by bringing the machine to a standstill by the slow application of the foot brake. In these wick carburetters there are, of course, no jets to choke, and the petrol level need not be accurately set, a slightly high or low level in no way affecting the running of the engine; while another point in favour of their simplicity lies in the fact that no amount of jolting is calculated to upset their working.

The Shearn carburetter possesses several distinctive features, and the inventor claims that he regularly obtains 100 m.p.g. on the machine above referred to. The air lever acts like a variable jet in that it governs primarily on the petrol used, and by means of it the area of gauze and absorbent material is varied, giving an increased or diminished amount of fuel as required.

The gauze and absorbent material are easily and cheaply replaced, though it requires a considerable accumulation of dirt to upset their working.





## COOLING AND LUBRICATION.

### METHODS OF INSULATING THE PISTON TOP.

THE article by "Chinook" (September 13th, 1917) gives food for further thought on this question. It would seem that the idea of keeping piston temperature within reasonable limits is coming more and more to the front.

There are, as "Chinook" says, many ways of cooling the centre of the piston by draughts of air. But unless it is desired to use the hot piston as an accessory to easier carburation by allowing the draught of air to pass through the carburettor either before or after passing through the piston—it is obvious that the best way to keep down the temperature of the piston is "to not let it get hot"—in other words to insulate, or partially insulate, it.

This could be effected by making the upper portion of the piston non-conducting, whether by the interpolation of layers of air, mica, asbestos, or other material, would be best found by experiment. Four sketches are given. These show the simplicity of the idea, but by no means exhaust the methods of carrying it out.

#### Effect of an Insulated Piston.

The ideal piston, in addition to being weightless, would also be perfectly non-conducting as regards heat. Neither of these ideals can be attained, but it is well worth while to consider what would be the advantages of a *partially* insulated piston:

(a.) Lubricating oil in the crank case protected, and its good qualities preserved.

(b.) Heat otherwise used in raising the temperature of a solid piston would be given out as useful work, thus ensuring a more efficient engine.

Now at first sight it may appear that (c) there will be increased danger of pre-ignition owing to the heat developed in the top plate of the insulated piston, the plate being necessarily of metal; (d) that in any case the engine will be hotter.

It is evident that a thin plate on the top of an insu-

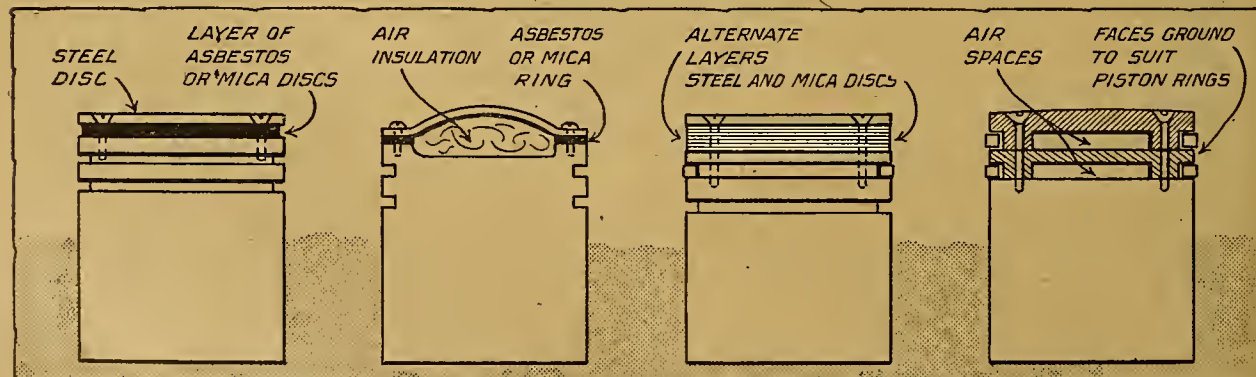
lated piston will rise to a higher temperature than a solid piston. The actual *capacity of the plate for heat* is, however, very small in comparison to that of the solid piston, so that when subject to the cooling influence of gases at atmospheric temperature the plate will cool much more rapidly. This would happen at every induction stroke when the mixture is drawn into the cylinder.

#### What becomes of the Heat.

At this point it may be mentioned that the insulated piston engine would reach normal conditions sooner than the solid. A motor cycle would not have to run twenty miles before the engine was doing its best, as a correspondent recently asserted to be the case. It may be said (d) if there is less heat used in raising the temperature of the piston, what about the cylinder walls and what becomes of the heat set at liberty? If instead of using heat to warm up a lump of solid metal you employ it in giving out useful work again we should find that we need bring less total heat into the cylinder, consequently we should expect, and have every right to expect, to work on a slightly reduced throttle. In other words, the engine would be more efficient. Take it, however, that we still bring in the same quantity of heat for power developed, we should then expect the cylinder walls to rise in temperature above the normal with an insulated piston. But here again we must consider the induction stroke. The mixture will absorb more heat from the cylinder walls with an insulated piston simply because of the small capacity for heat of the latter. Consequently this will tend to keep the cylinder walls cooler. Following this we have also the benefit of a better quality lubricant, which would permit a slight increase in temperature.

Provided the two pistons were tried on an engine with large and free exhaust and inlet ports it should be found that the insulated piston would give the more efficient engine.

ENGRO.



Ideas suggested by "Engro" for making the upper portion of the piston non-heat conducting.



# Gas Cylinders for Motor Cycles.

## Some Considerations on the Weight of Gas-holders.

IN view of the coming necessity for using gas for driving motor cycles, it is useful to know what sort of space a useful amount of gas can be put into, and also to have some notions about the design of the gas-holders. It will be seen from the following investigation that the weight of metal required to carry a given amount of gas is, for a given shape of vessel, proportional to the mass of gas that it has to carry.

### Spherical Vessels.

Let us consider first of all the simplest and most economical kind of gas container, namely, a spherical vessel. It is the most economical in the sense that it requires a smaller weight of metal than any other shape to carry a given quantity of gas.

Let  $r$  be the radius of the sphere,  $p$  the pressure of gas inside the cylinder,  $p_0$  the atmospheric pressure,  $v_0$  the volume of the gas at atmospheric pressure,  $P$  the safe tensile stress in the material, and  $h$  the thickness of the material.

Then, because the temperature of the gas inside the vessel, and before it was put in, is the same, we get, by Boyle's law ( $v$  being the volume of the sphere),

$$pv = p_0 v_0$$

Also, by considering the equilibrium of half the vessel with the hemisphere of gas it contains, we find that the excess of gas pressure over atmospheric, acting over a circle of radius  $r$ , is balanced by the tensions over the rim of the hemisphere; that is,

$$\pi r^2 (p - p_0) = (\text{area of section of metal}) \times P$$

From this we find that

$$h = \frac{1}{2} \frac{r(p - p_0)}{P}$$

Since the surface area of the sphere is  $4\pi r^2$ , then the volume of metal used is

$$4\pi r^2 h = 2\pi r^3 \frac{p - p_0}{P}$$

But

$$p = \frac{p_0 v_0}{v}$$

Therefore, the volume of metal in the containing vessel is

$$2\pi r^3 \frac{\frac{p_0 v_0}{v} - p_0}{P} = \frac{2\pi r^3}{v} \cdot \frac{p_0}{P} (v_0 - v)$$

But  $v$  is the volume of the sphere, and, therefore

$$v = \frac{4}{3} \pi r^3$$

Consequently the volume of metal is

$$\frac{3}{2} \frac{p_0}{P} (v_0 - v)$$

This is a most interesting result, for it tells us that the volume of metal required to contain a quantity of gas is proportional to the quantity of gas that can be got out of the cylinder for use. The actual mass of gas that is put into the cylinder is proportional to  $v_0$ , this being its volume at atmospheric pressure. But the volume of gas we can get out of the vessel without suction is less than  $v_0$  by the volume of the containing vessel, that is, the actual volume at atmospheric pressure is  $(v_0 - v)$ .

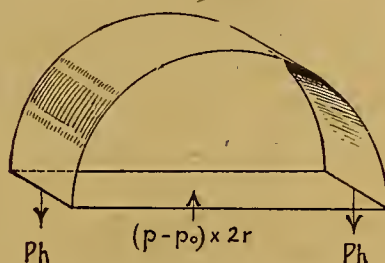
The other factors, namely,  $p_0$  (the atmospheric pressure) and  $P$  (the safe stress in the material), are constants.

The remarkable fact is that, as far as weight of the containing vessels is concerned, it is just as economical to make several small vessels as one large one. The thickness of the metal of different spheres at the same safe stress and same gas pressure is proportional to the radii of the spheres. This thickness is also proportional to the gauge pressure  $(p - p_0)$ .

### Cylindrical Vessels.

As it is not likely that spherical vessels will be used, there is no point in carrying the investigation on spheres further. But precisely similar results are true for any other shape of containing vessel.

Let us consider now the case of a cylindrical vessel of radius  $r$  with hemispherical ends. The reason for choosing



hemispherical ends is because they have the best shape for resisting pressure. Flat ends are bad.

Let  $l$  be the length of the cylindrical part. As before,  $v$  denotes the volume of gas the vessel will hold and  $v_0$  the volume before compression.

In the case of a cylindrical vessel, the circumferential and longitudinal tensions are unequal. The longitudinal tension is exactly the same as in a spherical vessel, but the circumferential tension is twice as great, as will be proved.

In the case of a cylindrical vessel the circumferential and longitudinal tensile stresses are unequal, the former being twice as great as the latter. It is easy to show that the longitudinal stress is the same as in a spherical vessel of the same radius and thickness, assuming the contained gas has the same pressure in both cases. Then we must make the thickness such that the greater of the two stresses is the safe stress.

Let  $P$  be the safe stress, that is, the actual circumferential stress;  $h$  is the thickness of the metal, which we will assume constant over the ends as well.

The figure shows the forces acting on a portion of the cylinder and the gas it contains. (The longitudinal forces are not shown, as we are not concerned with them.) The portion shown is half a circumference and of unit length. The area of each section of the metal is  $h \times 1$  and the tension across each section is  $Ph$ . The force that the two tensions have to balance is the thrust of the gas across the flat base section, of which the area is  $2r \times 1$ .

Then equating these forces

$$2Ph = (p - p_0) \times 2r$$

from which

$$h = \frac{p - p_0}{P} r$$

The total surface area of the metal is

$$2\pi r l + 4\pi r^2 = 2\pi r (l + 2r)$$

Therefore the volume of metal is

$$V = 2\pi r (l + 2r) \times h = 2\pi r^2 (l + 2r) \frac{p - p_0}{P}$$

The volume of the interior of the vessel is

$$v = \pi r^2 l + \frac{4}{3} \pi r^3$$

$$= \pi r^2 \left( l + \frac{4}{3} r \right)$$

Consequently

$$\frac{V}{v} = 2 \frac{l + 2r}{l + \frac{4}{3} r} \frac{p - p_0}{P}$$

If  $l$  is not less than twice the diameter, then  $(l + 2r)$  and  $\left( l + \frac{4}{3} r \right)$  are nearly equal. Therefore

$$\frac{V}{v} = 2 \frac{p - p_0}{P} \text{ nearly.}$$

As before, we get

$$pv = p_0 v_0$$

and therefore

$$\begin{aligned} V &= 2 \frac{p - p_0 v}{P} \\ &= 2 \frac{p_0 v_0 - p_0 v}{P} \\ &= 2 \frac{p_0}{P} (v_0 - v) \end{aligned}$$

an exactly similar result to the one we got for the sphere, the difference being that here we get a factor 2 instead of the former  $\frac{3}{2}$ .

### A Practical Example.

Suppose we want to carry a supply of fifty cubic feet of gas in a cylinder with a diameter of 1ft. and a total length of 3ft. If a steel cylinder is used we may take 20,000 lbs. per square inch as a very safe stress. Then the volume of metal in the cylinder is

$$\begin{aligned} V &= 2 \times \frac{15}{20,000} \times 50 \\ &= \frac{3}{40} \text{ cubic foot.} \end{aligned}$$

The weight of this at 490 lbs. per cubic foot is

$$\frac{3}{40} \times 490 = 36\frac{3}{8} \text{ lbs.}$$

The volume of gas space is

$$\begin{aligned} v &= \frac{\pi}{4} \times 1^2 \times 2 + \frac{4}{3} \pi \times \left( \frac{1}{2} \right)^3 \\ &= \frac{2}{3} \pi = 2.1 \text{ cubic feet.} \end{aligned}$$

The internal pressure is given by

$$\begin{aligned} p &= \frac{p_0 v_0}{v} \\ &= 15 \times \frac{50}{2.1} \text{ lbs./sq. in.} \\ &= 360 \text{ lbs./sq. in.} \end{aligned}$$

The gauge pressure is

$$p - p_0 = 345 \text{ lbs./sq. in.}$$

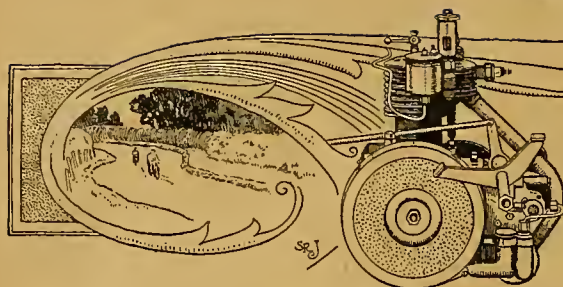
The thickness of the walls is

$$\begin{aligned} h &= \frac{p - p_0}{P} r \\ &= \frac{345}{20,000} \times 6 \text{ in.} = \frac{1}{10} \text{ in.} \end{aligned}$$

We see that it is necessary to carry 0.7 lb. of steel to hold a cubic foot of gas.

J. PRESCOTT, M.A., D.Sc.





## THE WHY AND THE WHEREFORE OF THE CLUTCH.

Every rider should possess a fair knowledge as to the exact working of his machine, and this article will help the reader to a thorough understanding of that important mechanism—the clutch.

**W**HO, in the early days of the motor cycle, cannot recall that entranced period when the possession of a "free engine" and a starting handle was a paramount desire in life? There was not much club life in those days, but each sporting county could muster a few true sportsmen, and I suppose everyone experienced in turn the overwhelming desire to possess a clutch by which the machine would glide off the mark like a car.

How well I remember my first! The machine, I believe, was of French origin, obtained in exchange for a  $2\frac{3}{4}$  h.p. Humber and sundry five pound notes. The drive was all-chain, and the clutch was on the engine-shaft—a metal-to-metal cone about the size of a five-shilling piece. It was impossible to throttle down the engine, and every time the clutch was engaged from a standing start thin parings of metal detached themselves from it and mingled with the chain. At the end of a fortnight it occurred to me to sell the beast while there was still a little clutch left, and half a dozen would-be purchasers were waiting on the doorstep to buy it. I expressed a desire to sell out of the district, but no matter. They knew its fault, knew the machine never ran more than ten miles without a thorough overhaul, but that free engine clutch compensated for everything.

### The Simplicity of Present-day Clutches.

So much by way of retrospect. When one looks back on the awful abortions of twelve years ago in

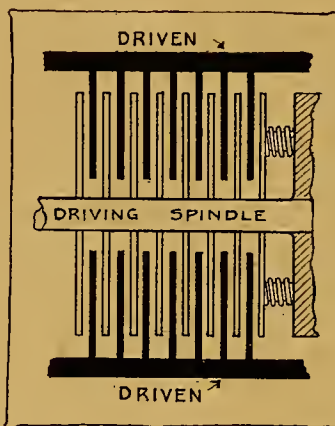
the way of motor cycle clutches one wonders why on earth they were so made? The motor cycle clutch of to-day is an obviously simple thing, nor is it a modern invention. The plate clutch, I believe, dates back a good deal further than the internal combustion engine—in fact, I am not quite sure that it does not date back, with the epicyclic gear, to a period prior to the Roman Conquest. But I may be wrong in this, and, if so, and if the inventor is living—humble apologies! It still remains rather startling that it took so many years for it to dawn upon anyone that the plate clutch, in a compact and efficient form, was obviously the very goods for a motor cycle.

To-day the clutch is the simplest and most reliable working component in the whole machine.

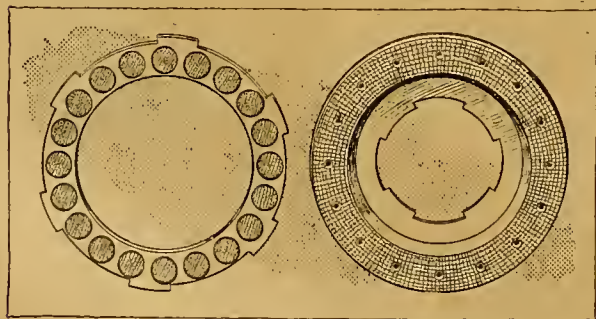
### The Best Position.

In the very early days, when no one had any idea of making an efficient clutch, it was naturally placed on the engine-shaft, for there, running at high speed, the same gripping qualities were not required as in the case of a clutch running on a geared down member of the transmission. But, as in the case just quoted, it soon became obvious that it is speed that kills.

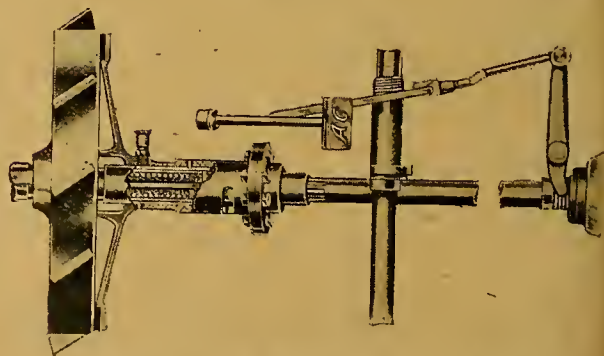
Engines in those days would not throttle down; or, if they would, the least application of the load instantly brought them to a standstill. Thus, the driving portion of the small friction surface was brought into engagement with the driven portion when one was revolving at high speed and the other stationary, with the result that movement between



A sectional diagram illustrating the working of a plate clutch. The plates are free to slide horizontally, but rotate with the member carrying them.



The two types of dry plate in common use—cork inset (left) and composition lined. This lining usually consists of asbestos and brass interwoven.



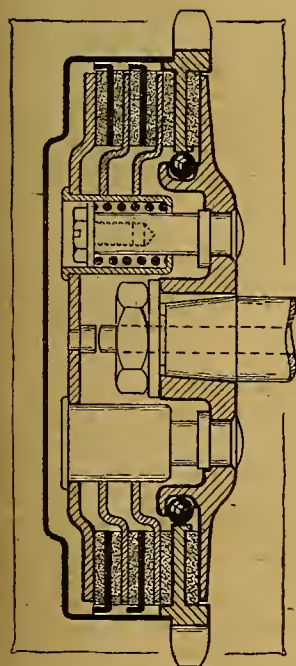
The single plate clutch employed on the A.C. light car.



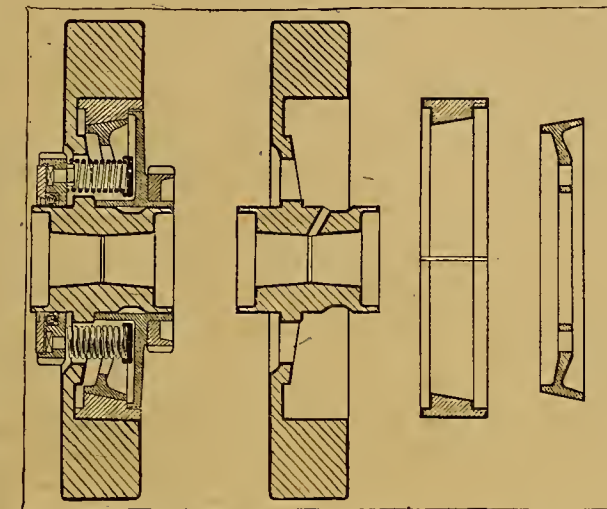
**The Why and the Wherefore of the Clutch.—**

them was enormous during the period of slip, and the friction surfaces suffered, as owners of early Humber tricars will recall. Of course, we have clutches running at engine speed to-day, but they are an entirely different proposition. In the Henderson, for instance, the clutch plates are of considerable diameter, the friction surface is great, so that, though the total heat loss may be approximately the same, it is distributed over so large an area that no harm can ensue.

From the engine-shaft clutch we went to the other extreme—the hub clutch, which, of course, was a vast improvement. Nevertheless it *was* an extreme, and as an engineering proposition there were other things against it in addition to the undesirable distribution of weight. A clutch subjected to the total road resistance and running at road wheel speed must be very sweet in engagement if it is to compare at all favourably with a clutch of even mediocre engagement running at half engine speed, while each little dither in the grip is conveyed directly to the road, having nothing but the spokes



The Sturmev-Archer dry plate clutch. The push rod can be seen protruding from the centre of the shaft, and the enclosing plate is merely a dust cover.



The clutch of the new Scott Sociable is of original design, embodying the principles both of the expanding ring and the metal-to-metal cone. On the right is shown the clutch complete, on the left the three principal units—flywheel, split steel ring, and nickel cone.

and the tyre to absorb it. Furthermore, the hub clutch is necessarily of small diameter, and it is obvious to anyone endowed with average engineering sense that the wider the clutch the greater the load it will drive at a given pressure on the plates.

**The Key to Efficiency.**

We have it, then, that the hub clutch fell short of perfection in one direction, while the engine-shaft clutch fell short in the opposite direction, and, therefore, the happy medium lies midway between the two—where we have it to-day, namely, on the countershaft. In the case of a flywheel the further the weight-carrying periphery from the centre the better, and similarly in the case of a clutch; the further the gripping surface from the centre the fewer the plates

necessary to convey a given torque—that is, if the clutch is of large diameter very light springs will provide the necessary pressure.

For these reasons the tendency for some time past has been to employ wide clutches with light clutch springs, another reason being that such clutches wear well and do not require a great deal of hauling out.

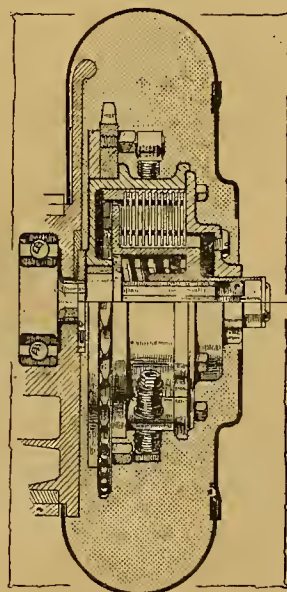
**For the Beginner.**

For the benefit of the uninitiated, it may be as well to mention that there are two kinds of plate clutch to be dealt with—the dry plate and the wet plate. Both work in the same way, the only difference being that in one the friction surfaces are metal to metal, running in oil; while in the other they are cork, or some other surface such as Raybestos, to metal, running dry. The simple sketch overlaid shows the working principle of such clutches.

Let us take it that the outside shell is driving and the inside spindle driven. Well, now, half the plates are mounted on the shell and must revolve with it, while the other half are similarly mounted on the spindle. All are quite free to slide horizontally, and it will be observed that those on the shell and those on the axle alternate with each other. Thus, if they are brought forcibly into contact with one another a very considerable gripping surface is acquired, equivalent indeed to the total area of both sides of one set of plates.

**Quantity Production and Comparisons.**

It must be borne in mind that the motor cycle clutch of the future will probably be a quantity produced affair. The same clutch will be adapted to machines ranging in power from 4 h.p. to 9 h.p. and weighty in proportion, therefore the tension of the springs should be adjustable over a wide range. The rider of a 9 h.p. outfit does not mind having to bring a little pressure to bear on the clutch lever, but the rider of a light solo mount may strongly object to it.

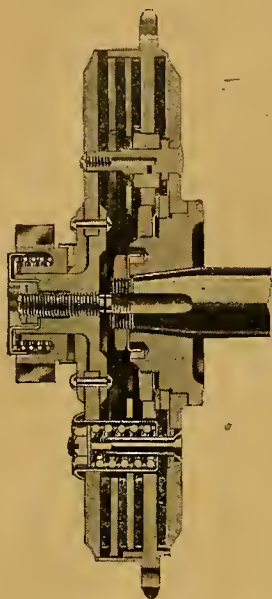


The Lea-Francis metal-to-metal wet plate clutch is a fine example of British practice. It is placed on the countershaft, and incorporates a spring shock absorber.



### The Why and the Wherefore of the Clutch.—

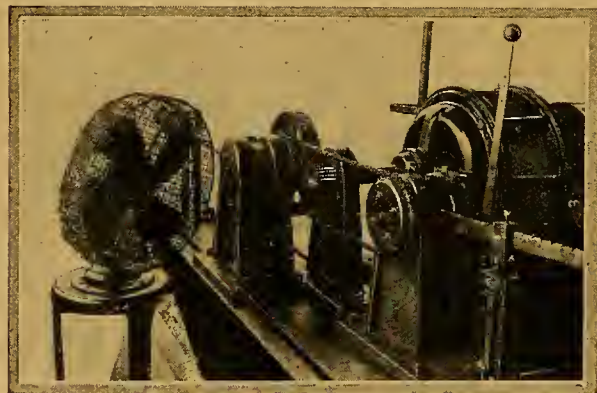
Personally, I prefer the metal-to-metal plate clutch to the inset variety. Each has its merits, and my own tastes may not be general. The disadvantage of the metal-to-metal (phosphor bronze to steel) type is that its good behaviour depends largely upon lubrication. It must be kept well oiled and adequately sheltered,



Cross section of the 1915 Indian clutch. It is Raybestos lined, and pressure is obtained by means of four coil springs.

and therefore it is adaptable only in the case of a totally enclosed drive. Further, it requires some attention, and it is never so free when disengaged as the dry plate variety, though this does not matter when it works in conjunction with a gear box giving a neutral position. Its advantages are that its engagement is infinitely sweeter than the dry plate—the "give" in the cork insets of which upsets the nicety of touch between slip and full engagement—that it cannot be burnt out; that it wears indefinitely; and that, when the plates are really worn thin, new ones are not (or should not be by quantity production) expensive, and are very much more easy to fit than insets are to renew and to grind down to a uniform level. In the unit con-

struction of the future we shall probably have the wet plate clutch contained in the integral casing, more or less inaccessible, and oiled, with the gear box, by the overflow from the engine. The dry plate clutch naturally adapts itself to careless ownership.



A Sturmev-Archer clutch undergoing brake test in order to ascertain its gripping powers. Note the scale for measuring the brake pressure. The fan is for cooling purposes.

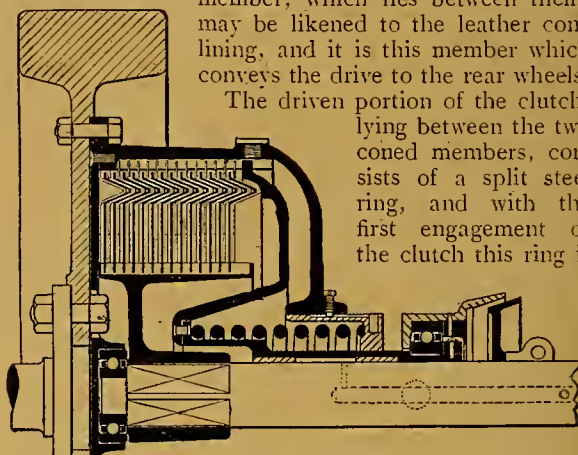
It demands no attention whatever till worn out, or burnt out, its engagement is reasonably sweet, and it is not susceptible to road grit, so that it will doubtless remain in high popularity amongst many manufacturers. In addition, we have, of course, the cone clutch and the expanding ring clutch. The

ordinary form of the first-named may safely be ruled off the boards so far as motor cycles are concerned, while the use of the latter will probably remain confined to the selective clutch gear.

In addition to these, one clutch which has impressed me very favourably, both on paper and in practice, and which comes as more or less of an innovation worthy of special comment, is the new design of clutch employed on the Scott Sociable.

This may truly be described as a three-phase clutch. Its construction is, putting the matter simply, as follows. Comparing it with an ordinary cone clutch the two coned members known normally as the driving and driven are, in this case, both driving. The driven

member, which lies between them, may be likened to the leather cone lining, and it is this member which conveys the drive to the rear wheels.



Half-section of the Hele-Shaw wet-plate clutch. The plates are grooved to increase the friction surface.

The driven portion of the clutch, lying between the two coned members, consists of a split steel ring, and with the first engagement of the clutch this ring is

gripped internally by the converse member, thus tending to take up the drive. A further engagement causes the ring to open till it begins to bind on the concave member, also revolving with the engine-shaft. Thus the gripping surface is doubled, and finally, with the split steel ring which takes the drive firmly wedged between the two coned members, the drive is pretty well solid.

In the Scott Sociable this clutch is contained inside the flywheel, purposely inaccessible, and it will be seen that, though being a cone clutch of the simplest order, it possesses double the gripping capabilities of the ordinary cone, while the split steel ring permits greater elasticity of engagement.

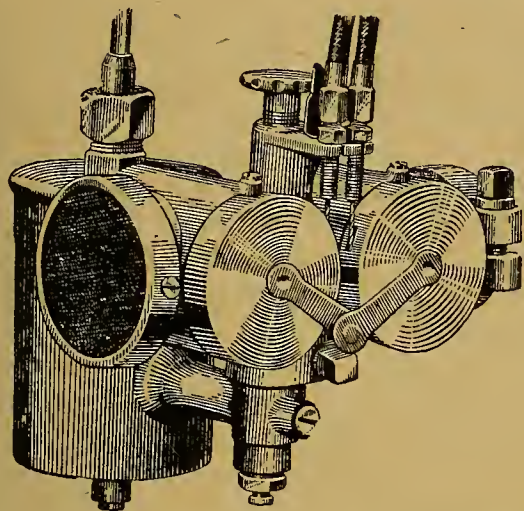
### Clutch Models.

The clutch of to-day is a highly efficient mechanism, and it is not at all improbable that the simplicity mount of the future will dispense with a gear box and employ only an efficient clutch of ample friction surface. It is, of course impossible to obtain more than engine torque through a slipping clutch, no matter how efficient it be, and therefore it can never entirely take the place of a gear box, but still the clutch model solo mount, on the lines of the 7-9 h.p. Indian, is a type which appeals very strongly to the sportsman.

The fact remains that with clutches in their present stage of development there is some future for the well engined solo mount in which the weight of a gear box is dispensed with, and in handling which the rider is called upon to use his skill both as regards the throttle and the clutch lever.

CHINOOK.



**B.S.A.**

## Some B.S.A. exclusive features.

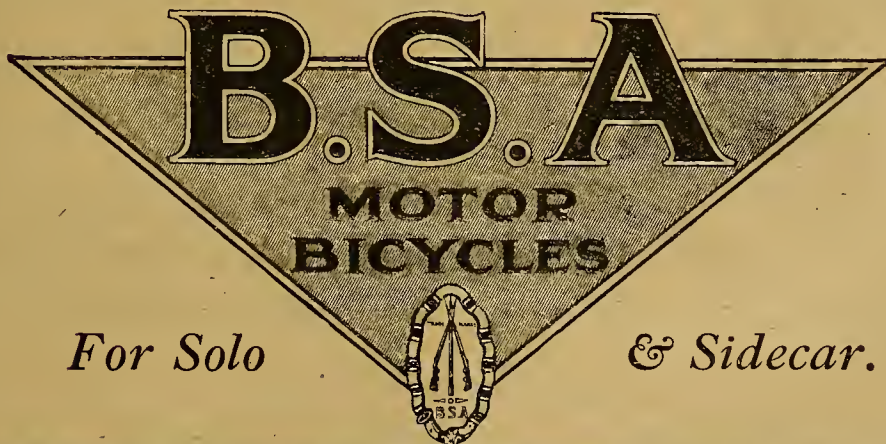
No. 4.

B.S.A. CARBURETTER.

**A** POINT of special interest in the B.S.A. Variable Jet Semi-Automatic Carburetter is the ease with which it lends itself to economical motor cycling. Without dismounting, the rider can alter the jet by a slight turn of the adjusting screw, and regulate the amount of petrol vaporized to suit any condition from walking pace to full power for hill climbing. The B.S.A. Carburetter is of the well-known B.S.A. quality, material and workmanship, and the B.S.A. system of perfect interchangeability is strictly adhered to.

Write for Latest B.S.A. Catalogue.

THE BIRMINGHAM SMALL ARMS CO. LTD., 47, Small Heath, BIRMINGHAM.



*For Solo*

*& Sidecar.*





*M<sup>r</sup> Just-Perfect*

## Impressions on the Road

**I**MPRESSIONS  
are of two kinds—  
good and bad!

I might almost claim  
monopoly of the former,  
and not even a nodding  
acquaintance with the  
latter!

## - and on the rider

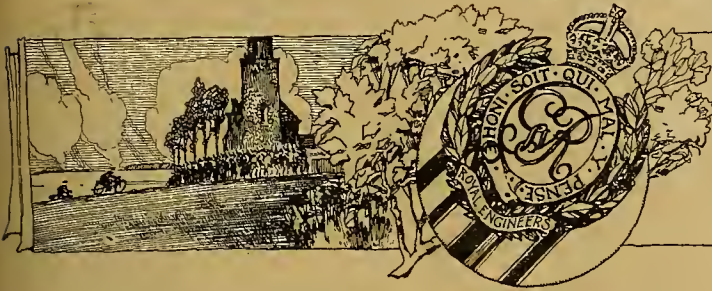
*From Cpl. G. Young, D.R., 60th Divisional  
Signal Coy., R.E. (Attached) C.R.A.  
Headquarters, "Elm Lodge," Sutton-  
Veney, Nr. Warminster, Wilts, 15/3/16.*

*"Having used your Tyres and Belts on  
various makes of Motor Cycles during 18  
Months Service as Despatch Rider with  
H.M. Forces, I beg to state that I have  
found both Tyres and Belts give every  
satisfaction. They have stood the most  
severe strain, and are proof against the  
most trying conditions and rough usage  
incidental to continual service on a W.D.  
Machine."*

"The man who says he  
knows a better Tyre than 'PEDLEY',  
is still looking for it!"

J. PEDLEY & SON, LTD., OXFORD WORKS, GREAT CHARLES ST., BIRMINGHAM.  
LONDON ADDRESS: 30, HOLYWELL LANE, GREAT EASTERN STREET, LONDON, E.C.





## MILITARY NOTES.

### A WOUNDED A.S.C. MAN'S OPINION.

ONE A.S.C., M.T., driver has written to us, and his letter is certainly pathetic in its rather valuable evidence as to the danger encountered by some drivers in the execution of their duty. This correspondent, who wishes to remain anonymous, tells us that he is a cripple for life owing to part of his thigh having been blown away.

and an ideal 'bus for our work. Hundreds of Duggies will be found in 'Mess nps' (Mesopotamia), a great majority of them in Bagdad. Strange to say, I have never heard of a Dug overheating, even although the temperature here the last two months has averaged 122° in the shade, and on many occasions 126°.

### NEWS FROM MESOPOTAMIA.

THE following is a very interesting letter received from despatch riders in Mesopotamia: "As you are aware, the success of any D.R. depends chiefly on his machine: whether the machine is suitable and reliable for the conditions prevailing. In those respects we have nothing but praise for the way in which our Douglas motor cycles have stood up to these very trying conditions. The machines are 1915 two-speed models, and have been running almost every day for eighteen months, and are still in good running order. Of course, a great deal of credit must be given the D.R.'s themselves for the care which they have given to their machines. It is also only fair to add that Lt. Vernon, our officer, has the best set of machines belonging to any company in Mesopotamia.

"There are very few real roads here, and a D.R. has to pick out his own way through the desert, and use his own discretion as to which track to follow. Often the sand is six to ten inches deep, and in many places impossible to ride through at all, so then the machine has to be pushed until a better part is reached. Here the light weight of the Douglas proves invaluable, as it is possible to push it. There are also Triumphs, A.J.S., and Ariels out here, but we think the Douglas is the most suitable, not from the point of reliability in particular, as all the other machines are of good make, but for its handiness in getting through thick sand.

"It is perhaps unnecessary to add that all the boys are simply waiting for the time when we shall get on the good English roads once more.



Pte. H. W. Ezard (in front) and two companions on a 4 h.p. W.D. Triumph Ezard has been a despatch rider for two years, and during the early part of his career served for some months as a private in the trenches.

### ONE OF THE OLD BRIGADE.

PTE. J. WHEELDON, M.T., A.S.C., who has been a despatch rider since the beginning of the war, writes: "With respect to J. W. Pearson's criticism of the A.S.C., M.T., motor cyclists, I should recommend him to enquire how many motor cycles are destroyed by the 'fearful shrapnel' before he ventures to talk on the subject. I am at present with a heavy artillery group, and for the last three weeks four of us M.T. despatch riders have been working between the Infantry Brigade Headquarters, which necessitates riding five or six kilometres on a wooden track and a walk of another two kilometres. I may also state that I never took this 'joy ride' without seeing more than one M.T. lorry absolutely smashed, and on two occasions saw a caterpillar meet with the same fate.

"I have been in France since August, 1914, working as a D.R. all the time. The grumble about the pay of the M.T.'s appears to be general, and we have heaps of 'friends' on that account. I maintain that if a man proves himself efficient and keeps going for, say, two or three years, he is worth the money paid. I will always raise my hat to an infantryman, and I hope 'J.W.P.' will look up the doings of the D.R.'s on the Marne and Aisne; that is the best cure I can recommend for such a shock he has received."

### COMMENT ON B.S.A., DOUGLAS, AND A.J.S. MACHINES.

CPL. BLACK, R.E. despatch rider, writes from Mesopotamia, and makes some interesting observations, which we give below:

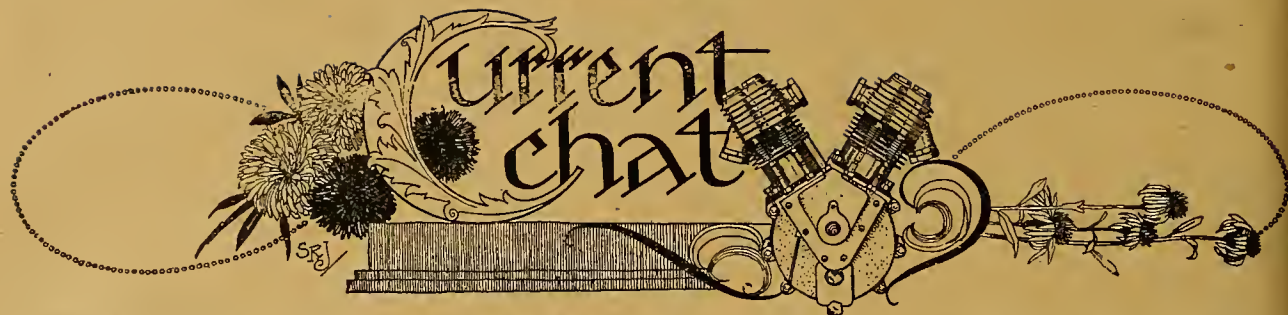
"Just a word or two on despatch riding in Mesopotamia. Since February last I have ridden four different makes of machines, viz., Triumph, B.S.A., Douglas, and A.J.S. I must say the B.S.A. has come out top. This particular machine was presented to the 15th Div. Sig. Co., along with eighteen others, by the Rajah of Mysore, and has been on service for two years. I am proud to say that ours is the only company possessing B.S.A.'s in Mesopotamia. "I also tried the 2½ h.p. A.J.S. Now to look at this machine one would say such a pretty 'bus will never stand up to hard work, but, by jove, it is wonderful how this little 'bus ploughs its way through dust 12 in. deep. The only fault I find with the A.J.S. is that the difference in ratio between top and bottom gears is far too great. In bottom gear the engine races like a two-stroke, and in changing up one would actually think it was eight-stroking. The hand clutch, however, is very useful. I wish the B.S.A. people would fit one like it instead of the very stiff foot control.

"All due credit to Douglas Bros. for their little incomparable 2½ h.p.—the best machine made for the Government



Scott motor cycles and Rolls-Royce armoured cars on one of our Eastern Fronts.





## TIMES TO LIGHT LAMPS.

## GREENWICH TIME.

Oct. 11th	...	...	5.45 p.m.
" 13th	...	...	5.41 "
" 15th	...	...	5.37 "
" 17th	...	...	5.33 "

## Carbide.

What many of us have expected for some time has at last happened. The sale of carbide is now entirely forbidden by the Minister of Munitions, so that the position with regard to carbide is even worse than that with regard to petrol, for at present we understand that there are no such things as carbide permits, and it is simply a case of going without if one has none in stock.

## A New Acetylene Engine.

This is all the more unfortunate, inasmuch as we understand that an inventor has recently succeeded in running both a car and a motor cycle on acetylene gas for a considerable distance—something only a little short of a thousand miles. It would certainly seem that the Government has got wind of this, and has hastened to put a full stop to any possibility of the revival of motoring.

## Electric Lighting.

The restriction on carbide will undoubtedly give a fillip to the introduction of electric lighting, which, of course, at any time is better than acetylene; but once again we are caught, because it is very difficult, though not quite impossible, to obtain accumulators.

## An Advantage of Belt Drive.

An advantage of belt drive that is very evident at the present time is the ease with which spares may be obtained. The owner of a chain-driven machine who is unfortunate enough to get a broken chain will probably have to lay his machine up until—well, who knows? Fortunately, however, belts are still easily obtainable.

## The Motor and Cycle Trades Benevolent Fund.

At the monthly meeting of the executive committee of the Motor and Cycle Trades Benevolent Fund, the hon. treasurer reported a balance at the bank and in hand of £1,741 18s. 7d., £2,000 having been invested in 5% Exchequer Bonds in accordance with the instructions of the committee at the last meeting. On the relief list were the names of forty-three applicants, all of whom were assisted according to need. Cheques amounting to £263 7s. 3d. were drawn to cover the relief voted.

## The Perfect Streamline.

The most striking example of streamline form that we have yet seen is illustrated in the current issue of our sister journal, *The Autocar*.

## Mr. Pemberton Billing's Car.

We refer above to the car owned by Mr. N. Pemberton Billing, M.P., who was in Coventry recently. A representative of *The Autocar* had an opportunity of inspecting this car, and was very favourably impressed with the magnificent bodywork and the almost perfect streamline effect. The body of this car is constructed almost exactly the same as the nacelle of an aeroplane, i.e., of strips of spruce interspersed with aero cloth, and covered with specially prepared rubber solution, and, of course, enamelled and varnished to give the necessary finish.

## Behind the Times at Malta.

"Big Twin," writing in the *Malta Herald*, complains against a regulation which still rules in that city: "Motor cyclists are not allowed to drive through the streets of Valetta, so that it only remains to the unfortunate motor cyclist either to leave his machine outside Porta Reale at the mercy of street urchins, or

## SPECIAL FEATURES.

## FLYING FACTS AND THEORIES.

## THE WHY AND WHEREFORE OF THE CLUTCH.

## GAS CYLINDERS FOR MOTOR CYCLES.

spend his energy in pushing his 180 lb. load!" Why is the motor cycle, which occupies so little space and is as controllable as any other vehicle on the road, debarred the privilege which heavier traffic enjoys?

## New R.F.C. Tunic.

The interesting topic of the moment with flying men is the question of the new uniforms. Some suggest that the French grey of the R.F.C. Staff cap bands will be the new colour. That wag, Rumour, has it that the French grey tunic, with scarlet riding breeches and black field boots, will be the order. Others have pronounced in favour of the horizon blue, whilst some are in love with the German field grey, which is really a sensible colour, but it is expected that the authorities will adopt the regulation blue cloth of the Navy. Whether the design will be the same as the uncomfortable R.F.C. tunic at present in use is not known.



## AN INCIDENT DURING A RECENT TREK OF THE 208TH BRIGADE.

One of the two D.R.'s attached was haled up by the police owing to having no front number plate on his Douglas. He was good naturedly told to get some chalk and inscribe them on the guard itself.



**36 h.p. Triumph, £15.**

"Triumph, 36 h.p., splendid condition, accept £15 quick sale; only wants seeing."—*Vide Birmingham Post*. We have not dealt with this model in recent issues.

**Police Motor Cyclists.**

At Portland, Oregon, U.S.A., the local police have decided to employ motor bicycles instead of cars. The men using the machines will be required to telephone from their bases every half-hour so that they will be constantly in touch with headquarters.

The Los Angeles police depot have also given an order for twenty twin-cylinder Indians and four single-cylinder models. The high-speed machines are for stopping motorists who exceed the speed limit, and the single-cylinder mounts are for patrol work.

**The Chemistry of Petrol.**

It is extraordinary what hazy ideas most motorists have as to the constitution of their ideal fuel—petrol. Petrol is a hydrocarbon occurring low down in the paraffin series. It is a mixture of substances, and consequently has no definite chemical formula. Its lightest constituent is pentane  $C_5H_{12}$ , the next constituent is hexane  $C_6H_{14}$ , while the next is heptane  $C_7H_{16}$ , and in some petrol even octane,  $C_8H_{18}$ , may occur. The comparative value of the fuel, from the motorist's point of view, depends upon which of these constituents holds the predominance. If the light members are in the majority, the fuel is easily vaporised, while if the heavier members are more evident vaporisation becomes increasingly difficult with their presence. It is possible that nothing lighter than heptane occurs in present-day war spirit, while in the earlier days—some ten years ago—pentane or hexane was the dominant spirit in nearly all motor fuels. We hope to have some articles on this subject in the near future.

**This Issue.**

The articles in this issue should meet the requirements of every class of reader. The beginner will find "Clutches" instructive and easy to digest. The mathematician will discover plenty of figures to check, and the casual purchaser will observe that the small advertisements are as interesting as usual.

**No Official Ban on the Use of Coal Gas.**

We are informed that the Ministry of Munitions does not regard coal gas as coming within the category of a petrol substitute. As coal is largely used for the manufacture of explosives, and gas is the first product therefrom, it is considered that there will be little or no difficulty in supplying motor car and motor cycle owners with all the gas they need.

**The New Petrol Licences.**

It does not appear to be generally known that if a licence for petrol is issued to an applicant, it is only issued on condition that he holds his machine, whether it be a car or a motor cycle, at the disposal of the Government in case of national emergency. Of course, this does not really mean anything, as in case of national emergency the Government has always had the right to commandeer anything it thought fit.

**Changing Gear.**

Riders who are accustomed to the Sturmer-Archer gear box will be well advised not to take such liberties in handling the lever, should a machine pass into their hands having a positive control. With the gear above-mentioned it is not necessary to declutch when changing up, as the change can be made quite neatly by lifting the valve, but we recently came across an unfortunate rider who had stripped his gears by attempting this method with a positive change system.

**The National Relief Funds.**

At the week-end the principal war relief fund stood as follow:

The National Relief Fund (distributed £3,657,822) .. ..	£6,273,926	0	0
British Red Cross Fund .. ..	7,339,465	16	1
Tobacco Fund .. ..	138,075	0	0

**A Pertinent Question.**

Recently a member of our staff pushed a machine he was despatching by rail to the station; and on arriving, somewhat heated, he was asked by an affable porter: "Ain't you got enough petrol to take you home, sir?"

**Rough on Gear Boxes.**

In a recent "Comment," "Ixion" was made to assert that he and a colleague have recently smashed four gear boxes between them, but he now informs us that the four should have read seven. Congratulations to "Ixion" and his colleague!

**"Light Car" Features.**

In our sister journal, *The Light Car*, there appear this week two articles of special interest, though of very different natures. One deals with an electrically-operated change-speed mechanism, and the other is on "Files and How to use Them."

**A Matter of "Revs."**

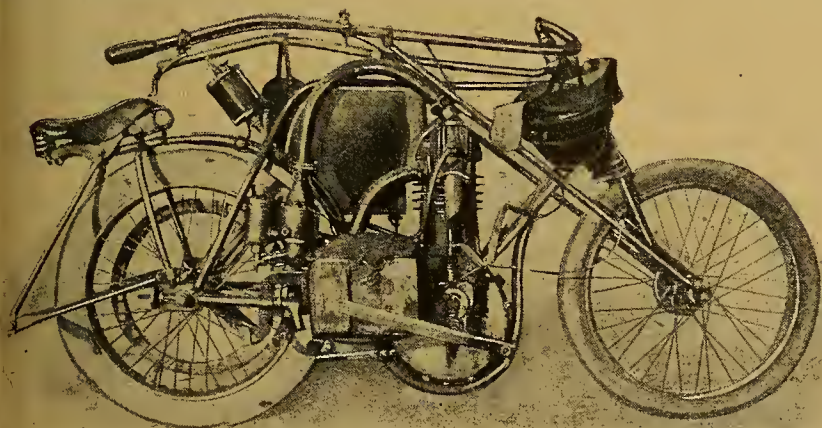
One or two engineers have expressed their doubt as to the accuracy of the Manufacturer's assertion in a recent "Critics," when he stated that a 2½ h.p. machine can be tuned to beat a 6 h.p. or 8 h.p. of the everyday type on a reasonable gradient, both machines to be fitted with sidecars in keeping with their build, and both well ridden. In one or two quarters, indeed, this assertion has been referred to as a reflection upon the intelligence of the trade, and the Manufacturer states his eagerness to hear the candid opinion of others of his kin whose experience embraces both types.

**A New Tyre Filling.**

We quote the following without comment from our American contemporary, *Motor Cycling and Bicycling*:

"While on a sidecar trip into a rather isolated section of northern New Jersey, Mr. LaRoe damaged the valve in his rear inner tube so that it was beyond repair. There were no motor cycle shops in the vicinity or within ten miles, and the situation seemed hopeless—but it wasn't. After deep and prolonged cogitation, the artful LaRoe shifted his sidecar tyre and tube to the rear wheel of his machine, and placed the airless tyre on the sidecar wheel. Then he packed the tubeless sidecar tyre with wheat until it was nicely rounded out, and finally soaked the contents thoroughly with water. When the wheat began to swell the tyre held its place snugly, and still afforded a certain amount of resiliency—about as much as would have been obtained from solid rubber. The homeward journey, on the wheat-filled sidecar tyre, was made without serious difficulty, and when the cover was removed Mr. LaRoe found that he had a pretty fair imitation of a dough-nut. The tyre was not appreciably damaged, and the wheat was good for another 10,000 miles."

To obtain still better results, try mixing a little yeast with the dough.



A 10 H.P. SINGLE-CYLINDER.

A pacing motor cycle used in Italy about 1903. We do not reproduce this photograph as anything remarkable to an old-time motor cyclist, but to the younger fraternity such a freak may be of interest. The single-cylinder engine would be about 10 h.p. Note the extraordinarily long inlet pipe, the huge car carburetor, the big lubrication pump, placed close to the rider's saddle, and the stays to support the handle-bars. The rider of one of these machines was seated as far back as possible, so that his body acted as a windscreen to the cyclist, who rode close up to the stay across the rear wheel, this stay being fitted usually with a roller to prevent an accidental touch throwing the cyclist. Belt drive, single gear, and battery ignition were employed.





# FLYING FACTS AND THEORIES

## Relative Motion:

## A Simple Consideration of a Much Misunderstood Principle.

SINCE the great majority of Royal Flying Corps pilots is drawn from the ranks of motor cyclists, or, in other words, from the readers of *The Motor Cycle*, it is thought that occasional articles dealing with some of the less obvious aspects of aeroplanes will prove of interest and utility, not only in setting forth certain fundamental facts which are not infrequently overlooked, but also in mitigating the sometimes deadly effect of certain popular fallacies.

It is probably not too much to say that ignorance of the conception of relative motion has been responsible for more disastrous crashes in the history of aeronautics than any other cause, especially in the earlier days when machines were less stable, and, consequently, more amenable to the "nerviness" of the pilot. Nowadays greater stability has inspired greater confidence, and the pilot, when faced with a dilemma, is a little more inclined to pin his faith to the unerring instinct of the machine. Where things go badly, however, is on those occasions, unhappily and unjustifiably frequent, when the pilot thinks the machine is wrong through an incorrect association of ideas, and in promptly proceeding to put it, as he believes, "right," only succeeds in making things go beyond the limit of correction.

A case in point is the idea that turning an aeroplane "up wind" and "down wind" are two entirely different operations, but it is only fair to say that this misapprehension has been unduly fostered by ignorant scribes in certain pseudo-technical journals.

When an aeroplane is in the air it possesses motion relative to the earth; motion relative to the air; motion relative to another aeroplane in the air; motion relative, in fact, to the sun, moon, stars, and every other conceivable object in nature; *but*, the only motion that has any bearing upon its behaviour as a flying machine is its motion relative to the air.

When an aeroplane is landing or getting off the ground its motion relative to the earth must be considered, but otherwise this aspect of the matter is of no consequence whatever.

If a machine flies at a speed of 60 m.p.h. relative to the air (*i.e.*, 60 m.p.h. relative to the earth in a dead calm), its speed is *always* 60 m.p.h. relative to the air, whether it is flying "with," "against," or "across" the wind, and whatever the speed of the wind may be. In some cases it may be travelling 30 m.p.h., 60 m.p.h., 120 m.p.h., or even backwards, relative to the earth, but its air speed remains perfectly constant, provided, of course, that the throttle is set and the machine is kept flying level.

### Flying in a Circle.

Now suppose a pilot is flying in a flat calm and desires to manoeuvre his aeroplane in a perfect circle, it is obvious that, if the sun were vertically over him,

the shadow of his machine would trace a circle on the ground; similarly, the smoke of his engine's exhaust would (theoretically speaking) make a circular ring in the air.

Now, let us suppose that he repeats this evolution in a steady wind. The circular track of smoke will remain a definite circular track, but the shadow trace on the ground will no longer be a circle but a cycloid. Instead of fig. 1 it becomes fig. 2.

In this sketch, from A to A represents a complete turn starting against the wind, and B to B a complete turn starting with the wind.



Fig. 1.

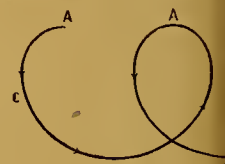


Fig. 2.

If when reaching the point A of the latter figure, which represents the motion of the machine *relative to the ground*, the pilot looks below him at some terrestrially stationary object he will, although his machine is moving quite steadily along the arc of a circle *relative to the air*, almost infallibly receive the impression that he is doing an exceedingly quick turn. He will instantly imagine that his machine is under-banked, will make what he believes to be the necessary correction, will consequently over-bank to a large extent, and, unless he has sufficient altitude to enable him to get out of the mess, will side-slip and crash to the ground.

At the point C the pilot, on looking down, will see the ground apparently moving sideways and outwards. He will probably conclude that he is side-slipping, and will nearly always under-bank his machine—a most fatal mistake, if anything worse than over-banking.

How often have we read: "... the machine was making a turn when it side-slipped and fell to the ground." Sometimes, when the ill-starred pilot has made a desperate attempt to straighten up at the last moment it is a case of "... side-slipped and nose-dived."

### Correct Banking.

Fig. 2 represents the earth-movement of a machine flying in a wind of one-third its own speed, *e.g.*, the speed of the aeroplane is 60 m.p.h. and the wind



Fig. 3.



Fig. 4.

20 m.p.h. Figs. 3 and 4 show respectively the curves of the same machine in winds of 10 m.p.h. and 40 m.p.h. Low as is the compara-



**Flying Facts and Theories.—**

tive wind speed in the former of these two cases, the apparently sharper corner in the cycloid is still exceedingly manifest.

If the machine is cut off from the earth by clouds the pilot will have no difficulty in keeping up a continuously circular course—he will merely hold his controls and let the aeroplane fly on: but it is to be doubted whether the most hardened pilot, having a full view of landmarks below him, could in a respectable wind dissociate himself from terrestrial ideas sufficiently to maintain a steady circular course.

In order to avoid the fatal error of overbanking or underbanking—at B in fig. 2 it is almost certain that the pilot will think he has too much bank on for so apparently slow a turn—a very simple instrument, similar in principle to a spirit-level, has been devised, which shows, without any possibility whatever of error, when the aeroplane is correctly banked. Fallacies die so hard, however, that there are plenty of otherwise excellent pilots, including a good percentage of otherwise competent instructors, who will flout the readings of such an instrument and put more faith in their own judgment. It is as well for them that the modern aeroplane is safe within fairly wide limits, and that there is a pretty wide margin each side of the correct bank which can be taken without immediately disastrous results.

**An Analogy from the Sea.**

The *fons et origo* of the whole trouble is that air is invisible, and that consequently the pilot cannot see the immediate results of his motion relative to it. He may, if exceedingly sensitive, *feel* the change in direction of air pressure upon his face which occurs when the aeroplane begins to side-slip, owing to overbanking, or begins to "yaw" as a result of underbanking. Such impressions, especially in a well-covered-in machine, must be minute, however, in comparison with the overwhelming and visible effect of his motion relative to *terra-firma*. The sea man, although his ship is subject to exactly the same considerations relative to the sea as the aeroplane involves relative to the air, has this advantage, that he can check his relative motion by means of small objects floating on the surface of the water. When a ship is in a tideway which holds it nearly stationary the sailor can easily see by the water that is flowing past him that he is making his usual headway relative to the water, although he may be doing but little speed relative to the adjacent coast; he is consequently never under any such delusion as is likely to disturb the aeroplane pilot.

**Further Examples.**

Although the argument set out above is perfectly clear and, I hope, convincing, it is singular how difficult it is to make even quite intelligent people grasp certain other instances of relative motion. I will, therefore, deal with a few easily-conceived cases involving familiar objects.

(1.) When a man walks along a road he has a motion relative to the earth, and to the wind, and to the cyclist who passes him, and to every other object whatever. But *the earth has also a motion relative to the pedestrian*, and it is just as true to say that he is kicking the earth backwards as that he is propelling himself forwards.

We are inclined to overlook this fact, because we have fallen into the habit of regarding the earth as stationary and the base point of all our observations.

(2.) When a man walks along a road at 4 m.p.h. in the direction of west to east, he travels at a speed relative to a convenient point in space of 4 m.p.h. plus the peripheral speed of the earth at his particular latitude. Even if we ignore the speed of the earth through space, this may amount to upwards of 1,000 m.p.h., but as the pedestrian never thinks of anything else except his motion relative to the road he would probably repudiate the figures if accused of that rate of walk. Yet he might be got to believe that, relative to the tramp he overtook on the road, he was only travelling at 2 m.p.h.

(3.) A railway train is travelling at 60 m.p.h., and a man leans out of one of its windows and throws a stone straight backwards at a speed of 60 m.p.h. The stone will simply drop in a perfectly vertical and straight line (neglecting eddy-currents in the neighbourhood of the train), and will strike the ground immediately opposite the point at which the stone was thrown. A man standing beside the line and seeing the stone drop perpendicularly would conceivably have some difficulty in perceiving that it had been thrown with considerable force.

(4.) Ask anyone to trace the path made by one of the pedals of a push bicycle when in motion. The odds are overwhelming that the answer will be offered in some such figure or convolution as in fig. 5, whereas with the usual gear ratio and crank length the graph is something like that shown in fig. 6.



Fig. 5.



Fig. 6.

The trace shown in fig. 5 gives a slight indication of the forward movement of the bicycle as a whole, but the preponderating idea is that the pedals have a more or less circular path. They *do* describe a circle relative to a point on the moving bicycle, but they make a cycloid relative to a stationary observer.

(5.) In a radial rotary engine of the Gnome type the cylinders describe a circle about the centre of the crankshaft, whilst the pistons describe another about the centre of the crank pin. Yet the pistons move up and down relative to the cylinders. Similarly, in this engine the crank case is said to revolve around the crankshaft, but it is equally true of the Gnome to say that the crankshaft revolves relative to the cylinders, or that in the case of the ordinary type of engine the crank chamber revolves round the crankshaft. The two types of motor are simply distinguished by considering which part of the engine remains stationary relative to the earth.

(6.) In a locomotive engine travelling on the rail at 60 m.p.h. the centre of each wheel is travelling forward in relation to the earth at the same speed as the locomotive, the top point of the wheel tyre has a speed of 120 m.p.h. relative to the earth, whilst the bottom point of the tyre has no motion at all. The bottom point of the wheel flange at the side of the rail is actually travelling backwards. Similarly, although the piston rod is apparently reciprocating (it, of course,



**Flying Facts and Theories.**

actually does so relative to the cylinder) it is, relatively to the ground, *always moving forward*.

(7.) The belt fastener of a motor cycle belt is *always travelling forward* relative to the ground, although when below the pulleys it is moving backwards in relation to the rider.

**Cycloidal Curves.**

In the ordinary way, relative motion, whilst confined to straight lines, is not particularly puzzling when considered deliberately, but movements in curves somewhat complicate the idea. Returning to the notion of the aeroplane flying in the wind and describing a continuous circle (fig. 7), by the time the aeroplane has reached B, starting from A, the wind will have blown it sideways to B'; similarly, when the machine virtually reaches the point C it is actually

at C'. At the next half of the circle the speeds of the machine and the wind are in opposition; thus, the virtual point D becomes the actual point D', the whole providing the cycloidal curve already dealt with.

It need hardly be pointed out that the converse case is also true—that is to say, if the pilot, when flying

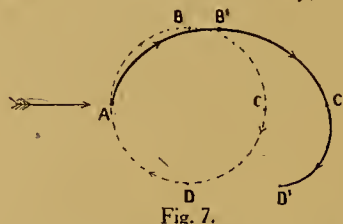


Fig. 7.

in a wind, desires to execute a truly circular turn relative to the earth he will have to make a cycloid relative to the air. He will, consequently, at one point have to make a very

quick turn and use a very sharp bank, so that the circumstances are just as deceptive and puzzling as they were in the first case considered.

## COAL GAS FOR MOTOR VEHICLES.

Not regarded as a Petrol Substitute.

THE Automobile Association has communicated with the Ministry of Munitions regarding the use of coal gas on cars, and as to whether this fuel might be used by motorists without restriction. It will be seen from the correspondence that the Ministry does not regard coal gas as a petrol substitute, and that the Home Office is being consulted regarding its unrestricted use.

24th August, 1917.

The Secretary,  
Ministry of Munitions,  
Armament Buildings, Whitehall Place, S.W.

Sir,—Your Department recently circulated through the daily press a request to the effect that coal gas might be utilised as much as possible for heating, light, and power purposes, in order that the by-products essential for munitions should be increased.

The continued scarcity of petrol has induced a large number of motorists to consider the adoption of coal gas on their cars, and the necessary gas containers and other fittings are being marketed. Some uncertainty, however, exists regarding conditions which might be imposed by the Government upon such users of coal gas, and especially whether the use of the fuel might be restricted by licences or strictly confined to cars used for special work.

May I, therefore, on behalf of members of this Association, place this matter before you, and ask if it be possible for an official assurance to be issued by your Department to the effect that coal gas may be used on motor cars without restriction?

I am, sir,  
Your obedient servant,  
STENSON COOKE (Major),  
Secretary.

The Secretary,  
Automobile Association and Motor Union,  
Fannum House, Whitcomb Street, W.C.  
22nd September, 1917.

Sir,—I am directed by the Minister of Munitions to acknowledge the receipt of your letter of August 24th with regard to the utilisation of coal gas on motor cars and to inform you that, so far as this Department is concerned, coal gas is not regarded as coming within the category of a petrol substitute. I am to add that the Home Office is being consulted as to the unrestricted use of coal gas on motor cars, and a further communication will be addressed to you in due course.

I am, sir,  
Your obedient servant,  
E. V. BACON  
(for the Secretary).

## THE U.S.A. PRESS AND MOTOR CYCLISTS.

THE press in the United States have taken up a very antagonistic attitude towards the motor cycle, apparently for no better reason than the objection to certain performances of harum-scarum riders. This is somewhat reminiscent of the newspaper journalism in this country some years ago. Though comment in our press was bad enough, they never went to the length that the U.S.A. journalists have done recently in damning the popularisation of the motor cycle.

The *New York World* recently had, says the *Motor Cycle and Bicycle Illustrated*, a bold headline running across two columns announcing that the motor cycle has been the cause of another fatal accident, despite the fact that the paragraphs which follow describe three automobile fatalities, two waggon accidents, and a street car case, in addition to the single mention of the motor cycle. It is worth noting also that the police, according to the article, hold the motor cyclist blameless for the accident.

This trend of editorial policy is not confined to a few newspapers. It is general, and all the educational work so far done by trade bodies has not changed it. This is too serious a situation to ignore.



A draft of recruits leaving the station of their training centre for instruction in the "Tanks."



## TRIALS AFTER THE WAR.

How Tests may be made more helpful to the Average Buyer.



IT is always wise to practise in peace the arts of war, and, conversely, it is advisable to consider during the war the questions which must be settled when peace comes again.

Among them the matter of "trials" is one of the most important from the motor cyclist's point of view.

There can be little doubt that the trials in vogue just before the war were by no means satisfactory. The excellence of machines and the skill of their riders had reached a point at which no ordinary course sufficed to differentiate between the sheep and the goats, and it was found necessary to ransack the country for freak hills in order to eliminate the inferior machines.

### The "Delivery Tune" Class.

This method possessed several grave disadvantages. In the first place, the hills, etc., selected were not such as the ordinary rider would ever dream of attempting. In the second, the competitors could "tune" their machines to any desired pitch before entering, so that the tests were no fair criterion of how the ordinary products of any firm were likely to behave in the hands of the private owner. It was urged in some quarters that these two factors cancelled one another—that if a specially tuned machine in the hands of an expert could do well on a freak course the untuned product would be likely to give satisfaction in the hands of the unskilled over an ordinary course. This reasoning breaks down on two counts.

First of all it utterly ignores the very patent factor of "delivery tune." It is true that a machine which is merely not specially tuned may perform well on an ordinary course, but what about the machines which are sent out actually maladjusted? After all, what the buying public wants to know is what make is likely to give satisfaction, and this is appreciably dependent on delivery time. Again, the more freakish a course is the more does the element of "luck" come in, and this is not altogether fair to the manufacturer.

### Machines to be Taken from Agents' Stocks.

We want a better system than this after the war. Let us by all means keep the T.T. races, sporting hill-climbs, speed trials, races at Brooklands, and London to Exeter runs, and let there be as much tuning for them as we like. But, for the big official trials—the A.C.U. Six Days and Scottish Six Days—I suggest the following scheme:

In order to eliminate all special tuning, the competing machines *will not be supplied by their makers.* The latter, when submitting their entries to the organising body, will enclose orders on their agents to supply as many machines as they desire to enter—or they may send cash.

The organising authorities will then go to *any* agent and take the machines away, and seal up the engines, gear boxes, clutches, etc. The riders will not have access to their mounts until the day of the trial.

By this means the organising authorities can ensure that the machines entered are absolutely fair samples drawn completely at random from those offered to the public. These typical machines could then be run over a more or less normal course, and penalised for defects in the usual way.

Elaborate special tuning would thus be eliminated, together with the necessity for freak hills, etc. This procedure would lend itself admirably to team trials, and a firm which got a team of three or six machines through with a clean sheet would gain well-deserved kudos.

### No Ban on Special Machines.

Of course, amateurs, "shamateurs," and professionals would be allowed to enter on special machines, and to win medals or the like galore. But the chief awards would be reserved for, and public interest would mainly be centred on, the machines competing under the above conditions.

This scheme should have a markedly good effect in stimulating care and accuracy in the assembling and testing departments, and would offer a far greater assurance of satisfaction to the buyer than the pre-war system.

It would be interesting to hear what manufacturers have to say.

W. WHATELY SMITH.



THE COMMERCIAL REAR CAR.

Will rear cars ever become popular in England? This is a question that has been asked more than once. Obviously they can take far bigger loads than sidecars, as is shown by the illustration of the Cygnet car. They have, of course, corresponding drawbacks, the chief being the treble track and the employment of four wheels.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### CIVILIAN MOTOR CYCLISTS.

Sir,—I beg to protest most strongly against the hideously unfair comment contained in the "P.S. by the Field Censor" in "D.R.'s" letter, and in so doing I am sure that I am voicing the opinion of practically all civilian riders at the present time. There are many doing double work, who can only do it by means of a motor cycle, and to stigmatise them as slackers is not only grossly unfair, but absolutely untrue. But it seems useless to point out to some people that petrol licences are not supplied to all who apply, but only to those who satisfy the Petrol Control Committee that their work is of real importance.

J. M. PHILPOTT.

#### THE SINGLE V. THE FLAT TWIN.

Sir,—The controversy on the above interesting subject seems to be drifting to a comparison between the two types of machines used for despatch riding on active service, and I should like to express my opinion on the subject.

Every motor cyclist, of course, is aware of the make of machines used by the Government, and, although there are faults and weaknesses in both, yet there is no doubt as to which is the more serviceable.

The disadvantages of the 2½ h.p. flat twin are insufficient strength and power in heavy going, and too little mudguard clearance. On bad roads the frames all break in time.

The single gains because of weight, which makes it hold the road better; three speeds and clutch, which give one a chance to plough through mud, and not have to wait for some help to lift your machine out, as I have experienced, and the benefit of the extra strength and power.

The drawback is the front fork, the spring frequently breaking, even when the fork is strapped up. This, in my opinion, is the weak spot of an otherwise fine machine.

I have refrained from a criticism of the other machines used out here, as the discussion seems centred round D.R.'s mounts, so I have left out the other makes which were used earlier, and this letter refers only to the recognised War Office types supplied to Signals.

NOSIVAD.

B.E.F.

#### CENTRIFUGAL FORCE.

Sir,—I am much obliged to "A.W.T." for his friendly criticism of my article on "Centrifugal Force," although I do not altogether agree with what he says. If it be granted that a single-track vehicle progresses along the road in a series of curves—curves admittedly of very large radii—centrifugal force must necessarily come into operation, and I fail to see on what grounds your correspondent bases his assertion that this force "has a very small part in balancing a bicycle." My own impression is that an elaborate series of experiments and calculations would be necessary to establish the precise proportions in which centrifugal force and other forces contribute to maintain the equilibrium of the machine.

However, a rough test is provided by bicycles in which no "mechanical balancing" (in the sense in which the term was used in the article) is possible. My own memory does not take me back to the days when the old high bicycles were familiar phenomena on our roads, and I have never experienced the fearful joy of riding one, but I believe I am correct in saying that they fulfilled precisely the condition just mentioned, inasmuch as they had straight front forks and a vertical steering column. These machines, in which mechanical balancing was impossible, were not much more difficult to steer than present day bicycles (again I am speaking without the book), which appear to indicate

that centrifugal force after all can claim the chief credit for keeping any bicycle upright.

As to the question of the suitability of choosing the balancing of a bicycle as an example of centrifugal force, this is, of course, entirely a matter of opinion, and, since in other respects "A.W.T." appears to be much of my way of thinking, I hope we can cheerfully agree to differ on this particular point.

MOHANDIS.

#### ACETYLENE ENGINE DESIGN.

Sir,—I note with interest Mr. Whatley's letter in the "Ideas" page of your issue of September 27th, giving a suggested design for an acetylene gas engine.

Your correspondent proposes a large bore and a short stroke, with a low compression, to overcome the tendency to spontaneous explosion. His method of obtaining low compression, however, by the unusual timing of the inlet valve, appears to me to be somewhat wasteful, as also the manner of controlling the gas supply.

With regard to the valve timing, surely the same effect could be produced, supposing it is necessary, by an unusually early, instead of late, closing of the inlet valve, at the same time obviating the waste of gas.

As to the control of the gas supply, possibly a generator of the "Low" type would allow of sufficient fluctuation in the demand without danger of explosion, especially if a safety valve were fitted, as the excess gas is dissolved in this generator, and the water supply is automatically controlled by the demand for gas, thus admitting of a positive throttling method instead of allowing the surplus to escape.

It should be remembered that, with a mixture of acetylene and air, the explosion is extremely violent, even without initial compression; so that with a large bore, as in Mr. Whatley's design, the cylinder would need to be of exceptional strength; also the connecting rod would need to be very stiff, not to mention the rest of the engine.

Therefore, in view of this property of rapid ignition and violent explosion, I am of the opinion that an engine of small bore running at high speed would be more suitable for use with this gas, as I should think that at ordinary motor cycle engine speeds there would be a great liability to knocking and consequent excessive wear. Probably the cooling also would require special attention, as the explosion temperature is high.

Apart from the engine itself, however, there is the important question of the acetylene generator. According to data I have by me, a cubic foot of acetylene generates 1,500 heat units, and a gallon of petrol about 144,000 units. Assuming then that the power generated is approximately proportionate to the heating values of the two fuels, the usual two-gallon tank would need to be replaced by a generator capable of supplying close on 200 cubic feet of gas. The weight of carbide alone, at a normal yield of 4½ cubic feet per lb., would be a matter of about 45 lb., to say nothing of the necessary water and the weight of the generator itself!

Of course, the gas supply, and consequently the mileage per charge, could be reduced if desired; and it is possible that, owing to the powerful explosion obtainable, acetylene might prove itself more efficient for a given heat value, thus increasing the available mileage.

As regards the cost, the two-gallon equivalent of 45 lb. works out at about 11s.: that is to say, if the carbide be bought from a wholesale firm by the hundredweight.

In conclusion, I may say that I do not pose as an expert.

E. RYCROFT.



**ARMY SIDECAR DRIVERS.**

Sir,—I read with interest in your issue of September 27th a paragraph headed "Army Sidecar Drivers."

I agree. I think it is quite time something was done for young fellows of eighteen years, especially those who can drive motors and motor cycles. I was eighteen last month, and have tried to get in the A.S.C., M.T., as a driver, and have been refused, notwithstanding that my father has served over two years with this Corps. The R.F.C. has been advertising for men. I applied for enlistment as a driver or a fitter, and received a letter stating that my services could not be accepted. Why is it that the A.S.C. will teach men, while young fellows like myself who can drive are refused? P. THURSTON.

**PROFITEERING.**

Sir,—I shall be glad if you will kindly allow me, through the columns of your valuable paper, to thank those correspondents whose letters have appeared in *The Motor Cycle* exposing the extortionate prices charged for Sturmev-Archer hub gear parts by some firms advertising as specialists in these gears.

Previously to reading the letters above referred to, I had obtained from one of these firms some planet pinions for my J.S. type hub, and the price charged for them was two shillings and sixpence each (makers' pre-war price, ninepence). I did not apply to Messrs. Sturmev-Archer Gears, Ltd., because, seeing these advertisements, I concluded the makers were unable to supply at present. Last week I required some more pinions, owing to my not having renewed as many as I ought to have in the first instance, and wrote direct to the makers of the hub. They informed me these could be supplied at one shilling each, and also that at present all parts for J.S. type hubs were in stock, and repairs to these could be undertaken. But, of course, this position may alter at some future date.

Cirencester.

ONCE HAD.

**THE IDEAL SOLO MOUNT.**

Sir,—In discussing which type of solo mount, "The Critics" have opened up a subject interesting to many enthusiasts. There must be many like myself using a light car for passenger work and requiring an efficient solo machine for other occasions. We want our mount in tip-top form always, but, being "men of affairs," we have little time to spare for extensive tuning. Excessive complication such as multi-cylinders must be ruled out, and the necessary comfort of smooth running can be practically obtained by an outside flywheel. A single-cylinder can be kept in good order with a minimum of attention, the crux of the problem being simply the easy removal of carbon deposit. A good  $3\frac{1}{2}$  h.p. single with a clean combustion chamber will do anything, but carboned up it is reduced to impotence. Arrange that the combustion chamber can be given a clean scrape in, comparatively speaking, a few minutes, and the problem is solved, provided that it is not necessary to disturb the magneto or valve timing in the process. The detachable head, into which the valves can be ground, saves profitless labour, because the piston rings, timing gear, magneto drive, etc., need not be touched. It should be possible to clean out carbon in the shortest space of time without disturbing other elements. My semi-T.T. single would be well within reach of my ideal if the removal of carbon were the simple matter it is with a detachable head. In other ways it can be kept in good order with but trifling expenditure of time. J.W.G.B.

London, S.W.

**TWO V. THREE-SPEED GEAR BOXES.**

Sir,—We, as probably the largest manufacturers of three-speed gears for motor cycles in the country, feel we cannot allow "Ixion's" remarks on page 293 of *The Motor Cycle* of September 27th to pass without comment. It is certainly news to us that "the trade" generally, to quote "Ixion's" own words, "have been in rather too big a hurry to cram three gears into the very restricted space available at the countershaft position."

We might point out to "Ixion" that the difference between a two and a three-speed gear is largely a matter of length of gear box, and as this length is in a transverse direction on the machine, there is no restriction that we know of to prevent getting ample proportions for all the working parts. In fact, for a sprung frame this length

is a big advantage, as it allows of a longer bearing being fitted to the pivot hinge of the frame behind the gear box than is possible with a two-speed box; and in that particular bearing length is much more important than diameter.

With regard to moving the gear box for adjustments of chain length, in our gear box at any rate the controls are unaffected, no matter how much the gear box is moved about, as the gear change quadrant is mounted on the gear box itself.

We regard the three-speed box generally as much less complicated from a rider's point of view than either of the two-speed gears mentioned in his article. To raise only one point, the expanding clutch type necessitates three chains instead of two (as in the case of a three-speed box), and if anyone has discovered a simple method of keeping the two engine chains (which have only one adjustment) in proper condition—well, we think the makers of the two-speed gears mentioned will be glad to hear about it.

We are quite certain that the said firms' "enviable outputs" have not been attained because of the fact that they are fitted with two-speed gears instead of three.

From "Ixion's" concluding sentence, one might easily assume that even he really considers that two speeds are not sufficient, as he advocates the use of an adjustable pulley to get more than two.

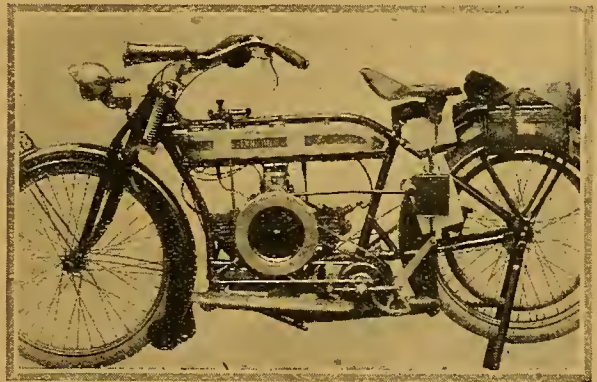
In conclusion, we might remark that until the advent of a motor cycle or car engine as flexible as a steam engine or an electric motor, it is certain that two speeds are not enough, at any rate for sidecar combinations.

STURMEV-ARCHER GEARS, LTD.

WILLIAM COMERY.

**HOW TO CARRY AN ACCUMULATOR.**

Sir,—Perhaps you will be interested in the arrangement I have for carrying the accumulator for my lamps. Being hung from the saddle, it gets the advantage of the springs and also of the steady effect of the rider's weight. It



Carrying the accumulator in a sprung position.

slides up and down on a rod fastened to the frame, and is steadied in the other direction by a tubular radius rod.

I have used it for several months, and have never spilt a drop of acid nor visibly damaged a plate. I have no experience of dynamo lighting. W. R. WILSON,

M.A., M.B., B.C., Cantab., Hon. Surgeon Doncaster Royal Infirmary, M.O. in Command R.F.C. Training Station, Vice-chairman local R.A.C. Committee.

Doncaster.

**AVERAGE SPEED.**

Sir,—Replying to Capt. Graham Hodgson's letter concerning the capabilities of his A.B.C., I would very much like to match a  $3\frac{1}{2}$  h.p. Sunbeam against this gentleman's machine. To convince him that he would not be wasting his time, I may say that I have attained a speed of 75 m.p.h. without stripping; and as a combination easily averaged 30 m.p.h. between Bristol and Birmingham on three occasions. I have also climbed Nailsworth Ladder with sidecar and passenger. Although I have scrapped with every outfit I have come across on the road, I am still looking for a match.

Regarding long distance averages, I did two trips between Bristol and Carlisle, 300 miles each way, at an average of



30 m.p.h.; and two between Bristol and London, 120 miles each way, at an average of just over 30 m.p.h. There are many ten-mile limits on the London Road, and the riding for the last ten miles is through London traffic, so one's mount would need to be in good fettle to maintain a good average. The Carlisle and London runs were accomplished on a 2½ h.p. Douglas E.K., R.F.C. Farnborough.

Sir,—In reply to "A.D. 2815's" letter in the issue of September 6th, I know the road between Birkenhead and Cheltenham, and have been over it many times. I should like to know the way he went, and how he supposes that anyone who has been over it can think that it is possible to average such a speed as 40 m.p.h. His machine, to judge from the photograph, looks pretty fast, but has he ever taken it on Brooklands and tried if it will do 75 m.p.h.? Gosport. 7 H.P. INDIAN.

Sir,—I have been greatly interested in the average speed question in your paper. This summer I had on two occasions to go from London to N.W. Yorkshire, my mount being a 2½ h.p. 1914 Douglas. I also returned by road.

My average speeds were: First journey north 23 m.p.h.; return, journey 21 m.p.h. Second journey, going and returning, 20 m.p.h. The distance is 227 miles, which I did each way in one day on the first occasion. The second time I started after lunch and stayed the night about half way, finishing in the early afternoon of the next day, and the same on the return journey. I found this much more comfortable than doing the 227 miles in one day.

The only trouble I had was a split butt-end tube on the first journey up, and the second time up the kick-starter gear went wrong, and I took it off. I know nothing of motor mechanics. On each occasion I did the 227 miles on just under two and a half gallons of petrol. My route was the Great North Road to Doncaster, thence *via* Wetherby and Harrogate to thirty miles north of Leeds.

Incidentally, I found the road surface throughout splendid, except for a mile or two at Grantham and near the race-course at Doncaster. I did not see a dozen motor vehicles on the whole distance outside the towns, but gangs of men were repairing and tarring the road about every twelve miles on the average. LIGHTWEIGHT.

London, N.W.

#### A MISFIRE TRACED.

Sir,—I recently had a misfiring in a single Bosch magneto, the reason for which I could not at first trace. I have now discovered that it was due to a new platinum screw that I had fitted. This was longer than the old one, and when in use the back end was less than a millimetre from the steel segment, consequently the current sometimes jumped the distance and missed at the plug. I filed the screw somewhat shorter, and the machine now runs without a suspicion of a misfire at any speed. H. W. BEAUMONT.

#### THE PETROL POSITION.

Sir,—May I, through your columns, voice a grumble which I am sure must be in the minds of every user of petrol at present in England. It is that the bodies who cater for all classes of petrol users have, so far as I can ascertain, done practically nothing to relieve the petrol situation. We have been at war for over three years, and petrol has risen over 300%, and if we consider that petrol three years ago at 1s. 4d. per gallon was much superior to petrol (so-called) to-day at 4s. 6d. a gallon, I doubt if 400% would quite cover the increase. I feel convinced that those responsible or other semi-thinkers will say that every motorist should be grateful in the knowledge that petrol can be obtained at any price, but that is not the point, and in considering the question under review we must ask ourselves whether the trust left with us by the many thousands of petrol users who have answered their country's call has received the attention it should?

I venture to name the two associations which are the most powerful in the country—the R.A.C. and the A.A. and M.U.—and when we remember that the former embraces six junior associations, the membership of the whole of these societies must number some hundreds of thousands, that, had the controlling forces acted with the strength that their power by virtue of their numbers gives

them, or with the foresight which can reasonably be expected from officers controlling the destinies of such concerns, the present impossible position would never have been reached.

In the first case, they would, while recognising that military needs are paramount, (a) have taken the necessary steps to prevent the terrific waste which has been very much greater than it is now, but which even now is, at a low estimate, 100% above necessity; (b) have taken what course was necessary to prevent the combines' making the charges they do at present; (c) by their power have quashed at its inception the absurd anti-motoring campaign commenced by a notorious halfpenny rag.

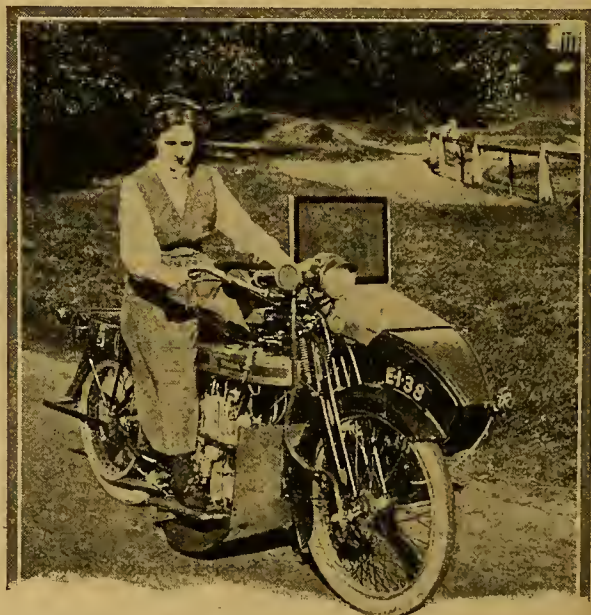
In the second case this may have a bearing in regard to (b), and should have been governed by their foresight in regard to the length of the war and its subsidiary effects—freight charges, cornering, etc.—but we have a right to expect reasonable foresight in committees of control of bodies with such numbers of members as those under review, and their attitude should have been to produce one or more substitutes—i.e., spirit from (a) shale or (b) potatoes. In any event, put in hand *at the outset*, the plant would have been of the very highest value to-day, and had (b) been adopted during last winter the larger potatoes from the subsidised farms would have brought in sufficient profit to pay for the distilleries and relieve the famine situation which existed.

In regard to the expenses incurred, I feel confident that at any time during the past three years had the position been explained in the various motoring journals, and the users of spirit informed that by supporting the scheme in proportion to their needs the desired British-produced and controlled "juice" would be available to them, the necessary capital would have been subscribed many times over.

Having stated my views on a situation which I regard as unnecessary, I venture to ask whether even now, at this the eleventh hour, is it too late to take such steps as would enable sufficient British spirit to be produced as would supply all British motorists, and compel the combines, of which all motorists are heartily sick, to keep prices to normal level?

If the associations are too conservative to move in the matter, would the trade papers, in combination, start a suitable limited company, the first and unalterable rule of which should be:

British capital only accepted. British subjects only accepted as members, who would have first claim on spirit sold. F. W. BEETLESTONE.



#### NURSING AND SIDECARRING.

Nurses are among the many who have realised the convenience of the sidecar in their profession. The owner of the 4 h.p. Douglas finds it an ideal lady's mount its smooth quiet running making special appeal to her feminine fancies.



# THE DAYS of CHIVALRY

## How a "Duke" came to the Rescue of Ladies in Trouble.

"I saw Aunt Betsy standing in the middle of the road with her hand up."

of her sixty years and thirteen stone odd. She has been known to push, without a murmur, for four miles on a hot day, and she does not turn a hair when it is Providence, I, that keeps us from sudden death by

and not collision.

Bang!

"Oh lor', what's that?" (My English always goes to pieces in a crisis.)

"That" was the sidecar tyre, which had somehow worked off on the side, nipping the inner tube, which had exploded like a bomb.

"Now what shall we do?" said Aunt Betsy.

"See 'Tracing Troubles'—no, that's no use for tyres; try *The Motor Cycle*. I haven't got it here, but I know you stuff them with grass. You pick grass while I get out the inner tube."

Much mystified, Aunt Betsy began to fill the luncheon basket with grass. We had stopped by a wide and grassy highway, but when we came to gather

the grass, there was not enough to keep a small sheep on a very reduced war ration. I do not know to this day where it went to, but all our efforts were swallowed up by that rapacious outer cover, without any appreciable result.

Then I tried to get the tyre back. I pushed, I pulled. I used two levers, then three, then four, and if I got it back at one point it leapt off at another.

"If anyone comes along, shall I stop them?" asked Aunt Betsy. Too hot and agitated to speak, I muttered some incoherent reply.

Suddenly I looked up and saw Aunt Betsy standing square in the middle of the road, with her hand up. Nothing was in sight, but in the distance I heard the faint sound of a motor engine.

"Halt!" said Aunt Betsy, for all the world like a Surrey special constable,



"We finished the journey with Aunt Betsy sitting on the carrier."

TWO months ago I became the proud but helpless possessor of a 3½ h.p. Sunbeam and sidecar.

My ignorance of everything mechanical was as colossal as that of most women, the majority of whom never know which way a nut turns, and could not for their lives tell the difference between a silencer and an induction pipe. However, I was filled with zeal; I bought "Tracing Troubles" and "Motor Cycles and How to Manage Them," and subscribed regularly to *The Motor Cycle*, reading the correspondence column with avidity, but with ever-increasing depression. It seemed so impossible that I should ever know what they were talking about. I made myself a perfect nuisance to the man who sold me the machine, until one day he said to me:

"You don't need to know anything about the mechanism; if you do have a stop, you have only to sit by the road and look pathetic, and someone will come along and do the whole job for you."

Much cheered by this immoral doctrine, I went home and practised looking pathetic sitting on the lawn, till I was urged by my friends to give it up. "No one would come near you if you looked like *that*!" they told me, so I gave it up and trusted to the Sunbeam.

### Rescued by a Duke.

My first rescuer was a duke. Of course, I am not really sure he was a duke, but in no other way can I account for his behaviour. It happened like this. I was driving quietly along, not ten miles from N—, with Aunt Betsy in the sidecar. Aunt Betsy loves the sidecar and the Sunbeam, and is an ideal passenger in spite



**The Days of Chivalry.—**

and a very much surprised combination did halt, abruptly, at her feet.

The combination consisted of a well-groomed A.J.S., ridden by a young man in overalls, and a sidecar, in which sat an elderly gentleman with a grey beard and an opulent look. On the door of the sidecar was a crest. The young man dismounted, and the elderly gentleman got out.

"What can I do for you, madam?" said the driver. The elderly gentleman said nothing.

I told him, to which he replied:

"Certainly, madam, with pleasure." Then, with the air of an obviously professional chauffeur, he set to work.

**Aunt Betsy on the Flapper Bracket.**

We kept up an amiable conversation, in which I complimented him on his skill and strength, while he told me, "Madam," that "this was no work for ladies, madam"—a sentiment I hastened to repudiate.

Finally it was done; the tyre was back (with the grass inside); we had received quantities of excellent advice and had expressed most grateful thanks in every variety of phrase that we could command.

Now throughout this performance, which must have taken the better part of half an hour, the elderly gentleman had stood one foot away solemnly surveying the whole scene, but not one single word did he say. It was not for lack of opportunity either. I addressed the world at large on several occasions, while

Aunt Betsy looked invitingly at him from the other side of the wreck, and it takes a very hard heart to resist Aunt Betsy, especially when she has her motor veil on. But no, not one single word did he say. We would have thought that he suffered from an impediment of the speech, but Aunt Betsy fancied—she will not swear that it was a fact—that, as the driver remounted and he took his seat in the sidecar, she heard him murmur:

"I suppose we haven't a spare tube, John?"—but I think that it must have been fancy.

Now what could he have been but a duke? Who but a duke would be so aloof? Who but a duke would have a crest on his sidecar, and who but a duke could have kept such a smart young chauffeur from being called to other spheres?

We finished the journey with Aunt Betsy sitting on the carrier, remarking tragically from time to time: "I hope I don't look like a flapper." She didn't.

S.

Mr. Walter Long, M.P., has been requested by the War Cabinet to take control of all questions affecting petroleum oils and petroleum products. Mr. Long has appointed Professor Cadman, C.M.G., to be his Technical Adviser and Liaison Officer between the various Government Departments. Professor Cadman will also take charge of an organisation to be established for giving effect to Mr. Long's instructions, and will assume the title of Director of the Petroleum Executive.

## A Novel Carburetter Design.

### An Automatically-controlled Pilot in a Single Lever Carburetter.

IN most modern carburetters having a pilot jet the latter is always on draught, with the result that faltering of the engine sometimes takes place when the main jet is brought into action. This may be due to an excessively rich or an excessively weak mixture on the instant of changing over, and there are few things more annoying in traffic riding than this momentary hesitation at the time, when quick response is most needed.

In the ingenious design of carburetter here illustrated the pilot is on draught only when the throttle is closed, and thereafter the carburetter functions as a single-jet automatic of the simplest type.

**A Pilot in the Throttle Piston.**

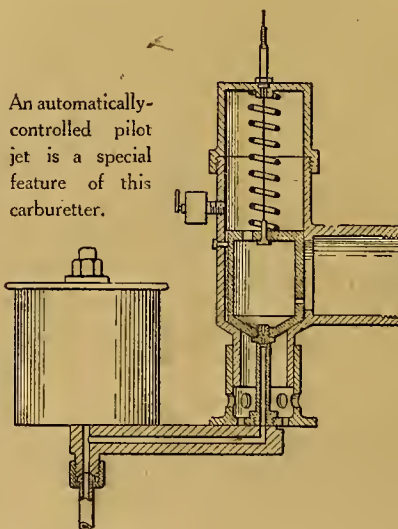
The distinctive feature of this carburetter is in the design of the throttle piston, which, it will be seen, is cone shaped at its bottom end, the mixing chamber of the carburetter barrel being similarly shaped to receive it. At the bottom of the piston, and actually forming a part of it, is the pilot jet, and with the throttle closed, as shown in the drawing, the pilot fits closely down on to the top of the main jet, thus admitting petrol to the interior of the hollow piston.

The throttle piston answers the purpose of a mixing chamber for the pilot. It will be seen that at the top of the piston is an air hole, which draws its supply from the top portion of the barrel containing the return spring. Air is admitted by means of a suitably adjustable valve, which is shown screwed into the barrel, so that the rider can himself adjust the pilot mixture to obtain a slow tick over for his particular engine.

In the side of the piston facing the bore of the induction pipe is a hole of the proper size to admit the pilot mixture. Immediately the throttle is opened the joint between the main jet and the pilot is broken, and the engine now runs on the main jet in the ordinary way.

This carburetter is the invention of Mr. Wallace Watson, of the Hexham Motor Co., Hexham, Northumberland, who has tested it extensively on a 6 h.p. twin-cylinder

Abingdon King Dick motor cycle. He asserts that he has obtained a consumption of 86 m.p.g. in ordinary touring, and that one great advantage of the carburetter is the remarkably easy starting it gives, and the slow tick over with throttle closed. It certainly appeals as an interesting proposition.





# QUESTIONS & REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of the envelope, and should be kept distinct from questions bearing on technical subjects.

## Oil Leakage.

**[?]** Since attaching a Philipson pulley to my  $3\frac{1}{2}$  h.p. two-speed Humber I have been greatly troubled with oil splashing on to the belt, footboards, etc. (on the pulley side of the crank case, of course). Please suggest a remedy.—DENTAL.

The trouble is probably due to a defect in the main bearing; either the bearing is worn or the oilways are cut so that the oil is thrown out of the crank case by the rotating shaft. The trouble might be cured by fitting a felt washer, or you might try the effect of cutting another oilway, which would tend to throw back the oil from the end of the shaft into the crank case. The Philipson pulley could not cause this trouble.

## The Local Taxation Licence.

**[?]** (1.) I have just bought a second-hand motor cycle, and, of course, I cannot get a petrol licence. Can this motor cycle be run for twenty-one days for trial purposes without taking out a local taxation licence? (2.) Ought I to have the number transferred to me at once, and does this necessarily entail taking out the local taxation licence? (3.) After trial purposes, is it necessary to take out the licence if I store it until after the war? (4.) Supposing I had some petrol given me, could I be pulled up by the police so long as I had the usual licence but not a petrol permit?—NOVICE.

(1.) If you use the machine at all you are liable for a local taxation licence now that it is your property. (2.) If you cannot or do not use the machine there is no necessity to have the registration number transferred to you at once. When, however, the number is transferred to your name you are immediately asked to take out a local taxation licence, but no proceedings can be taken against you if you prove that you have not used the machine and do not intend to use it. (3.) As soon as the machine is taken on the road you become liable for the tax. You are, however, allowed twenty-one days grace in which to take out the licence after having first used the machine. A licence at half fees is issued on and after October 1st, which is available until December 31st. (4.) We hardly think so, though the regulations say that petrol must not be "obtained" without being entered on a motor spirit licence. We have not heard, however, of any person being prosecuted for using spirit which has been given to him.

## The Mixture.

**[?]** (1.) I should feel greatly obliged if you would tell me what is considered to be the best proportion of air and petrol required to obtain the best mixture for a motor. (2.) Does the same proportion usually do for all speeds and loads, varying the quantities accordingly? (3.) What area does a jet number usually represent?—THISTLE.

(1.) It is generally admitted that the best proportion of air to petrol is fourteen parts of air to one of petrol vapour. (2.) When pulling at slow speeds a stronger mixture is required, otherwise the same proportion will do. (3.) The jet numbers usually represent the diameter of the jet in tenths of a millimetre or thousandths of an inch.

## Experimenting with Coal Gas.

**[?]** I have an idea for making use (if suitable) of coal gas for short distances, but before doing anything would like to test my  $2\frac{1}{2}$  h.p. J.A.P. engine on the stand by connecting it with rubber tubing to an ordinary gas burner, and would be obliged by your answer to the following questions: (1.) Would there be any danger in carrying out this test? (2.) How should I connect up to the engine or carburetter? Should the main air intake be closed?—H.S.

(1.) There would be no danger. (2.) We should recommend you to insert a gas pipe into the fixed air intake of the carburetter and experiment with your air and throttle levers, regulating also by the tap on the bracket. First remove the burner.

## Oil in the Magneto.

**[?]** I have a 7.9 h.p. Model C Indian sidecar combination, and have covered about 5,000 miles with no mechanical trouble whatever until my last run, when the engine stopped, just as if the throttle had closed. I examined both plugs, which were quite clean, tried the spark in the usual way, found none, so took out the carbon brushes, and found them coated with grease. I cleaned and replaced them, and found the sparking good, and the engine ran well. Later on it stopped, and I went through the same performance six times on a thirty-mile run. I have not stated that I also cleaned the collector ring each time I took the brushes out, and noticed the ring was bright only about two-thirds of the circumference. Should it be bright all around? Not knowing, I scraped the dull part, and found the scrapings like dark clay. I might add that, after taking out the plugs and brushes and cleaning and replacing them, the machine would run well for about five miles, and then pull up quietly.—E.E.

Take the magneto apart and clean it thoroughly. It looks rather as though you have been over-oiling it, but if this is not so it is possible that oil is working in from the timing case. This might be remedied by renewing the packing ring between the pinion and the magneto body or fitting a wider and thicker one. Most probably, however, the excess of lubricant is due to the proximity of the magneto to the cylinder, the heat having caused the grease with which the magneto was originally packed to run.

## IMPORTANT NOTICE.

### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

## Cylinder Dimensions.

**[?]** (1.) What would be a good bore and stroke for a seven-cylinder engine, the engine not to exceed 1,100 c.c.? (2.) What is the efficient c.c., or how much space should be allowed clear of the piston head at top of stroke, this including the capacity of the valve chambers? (3.) Can you recommend a good book with diagrams on motor cycle engine construction, also one on how to find the c.c. of an engine correctly? (4.) Can a suitable carburetter be obtained for a small seven-cylinder engine, or should I have to use more than one?—G.A.F.

(1.) The following dimensions will give the engine capacity you require:  $58 \times 59$ ,  $57 \times 61$ ,  $56 \times 64$ ,  $55 \times 66$ ,  $54 \times 68$ ,  $53 \times 71$ ,  $52 \times 74$ ,  $51 \times 77$ ,  $50 \times 80$ . (2.) From 40-50 c.c. in each cylinder. (3.) "Motor Cycles and How to Manage Them" contains many excellent diagrams and a table of cubic capacities. The formula is  $D^2 \times .7854$ . (4.) We should say that one carburetter would be sufficient. A small Amac or B. and B. should be suitable.



**Hints on Driving.**

**?** I have come to the conclusion that I have been using my foot brake too much for the good of my tyres. Would you kindly inform me if there is any objection to going down hill on top gear, with the throttle almost closed and the air threequarters open? Is this safe? Does it strain the engine in any way? It seems very satisfactorily slow, even for hills in traffic, and I find that I do not need to use my brake at all. The machine is a 1916  $3\frac{1}{2}$  h.p. Sunbeam with sidecar.—E.C.

Descending a hill in this manner does not harm the engine in any way. There is nothing to prevent your closing the throttle altogether should you desire to do so; in fact, this is the correct method of driving, namely, to use the brakes as little as possible and drive on the throttle. Provided you apply your brake progressively, however, it will not cause undue wear of the tyres.

**Difficult Starting.**

**?** I have a 1913 or 1914 model Swift cycle and detachable sidecar,  $3\frac{1}{4}$  h.p., fitted with Mark VI. Armstrong gear and kick starter. With the latter, however, I cannot by any means get the engine to start, my only way being by pushing, sometimes for twenty yards or so, with the decompressor raised. On dropping the valve lifter the engine (with decompressor still raised) is so stiff as to cause the back wheel to skid (low gear engaged). When eventually it does get going it pulls beautifully, though it is slightly addicted to "konking" on hills. The ignition and carburetter are in perfect order; the compression is high, although the engine was cleaned very recently. The lubrication is by means of a drip feed. I cannot get the engine to smoke, although the exhaust valve spring is covered with oil, apparently from the cylinder.

(1.) Can you tell me the cause of this difficulty in starting, and whether it be due simply to too high compression or to other causes?

(2.) What is the average position of spark, petrol, and air levers for an easy start?

(3.) How ought I to set the oil feed, and how determine when the engine is getting sufficient oil?

(4.) How much oil should I be able to drain from the crank case when the engine is warm?

(5.) What jet should I try when a 32 requires full air for half throttle, and beyond that chokes the pull of the engine?

(6.) What is a reasonable mileage to expect from this mount, without sidecar, on petrol?

(7.) What alterations will be necessary to convert it to run on paraffin or a half and half mixture without harming the engine?—E.B.

(1.) Be sure to see that there are no air leaks and that the carburetter air slide is not worn. Perhaps the compression is a little too high, and some improvement might be obtained, both in the running and ease of starting, by fitting a plate about  $\frac{1}{16}$  in. thick between the cylinder and

crank case. Never mind if you cannot get the engine to smoke; give enough oil, and this is all you need worry about. Use rather thinner oil, and try to push off on a higher gear.

(2.) Advance the spark almost fully, open the throttle (say) half way, and close the air.

(3.) Set the engine to take oil at the rate of thirty drops a minute at twenty miles an hour; rather more when you are travelling faster.

(4.) About two eggcupfuls.

(5.) 30; if this is too large, 28.

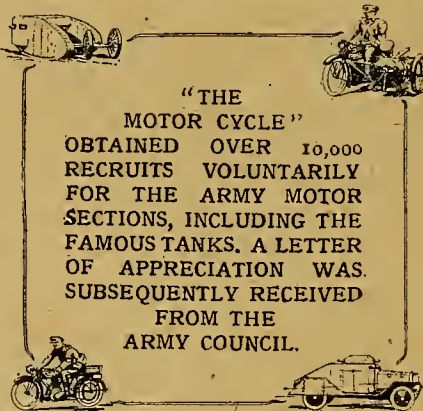
(6.) Without a sidecar you should get about eighty miles to the gallon.

(7.) It would be necessary to have a hot air intake for the carburetter, and probably to wind the petrol pipe round the cylinder head before bringing it to the carburetter, so as to heat the fuel adequately.

**How to Dissolve Celluloid.**

**?** Please let me know the name of acid or material which will melt old celluloid so as to make celluloid cement.—G.W.

Celluloid is dissolved in amyl acetate, which can be obtained from most chemists.

**Tappet Adjustment.**

**?** I have a 1915  $2\frac{3}{4}$  h.p. three-speed Douglas. When the engine is cold the machine runs perfectly, and will take an average stiff hill on top, but when it gets hot it starts missing (on the rear cylinder, I think). On the flat, doing about 20 m.p.h., it runs and fires all right when hot, but if it has more work than this to do the trouble recurs. I have changed the plugs and fitted a smaller jet (22), but cannot locate the trouble. Also when the engine is cold it will run beautifully with the spark fully retarded, but when hot it fires on one cylinder only. I have had the magneto (Dixie) down and could find nothing wrong.—A.S.F.R. (Lieut.).

The trouble is almost undoubtedly due to the tappet adjustment being incorrect. When the engine gets warm the valve stem expands, and owing to the tappet adjustment being too close the valve does not close properly. Run the engine warm, then adjust all four tappets so that there is a clearance of about the thickness of the blue cover of *The Motor Cycle* between the bottom of the valve stem and the tappet head. This failing, look for a cracked valve or cylinder.

**Running on Heavy Fuel.**

**?** I have an O.K. Junior which I intend running on paraffin, but have great difficulty in starting, and even after an injection of petrol I get no result. Please recommend any alteration or attachment to the carburetter to enable me to start.—R.S.

You will have to fit a two-way tap and auxiliary petrol tank so that you can start on petrol and continue to run on this until the engine is properly warm. It will also be necessary to fit a hot air intake from the carburetter to the cylinder or exhaust pipe.

**Gear Ratio.**

**?** I have recently fitted to my 1913 B.S.A. motor cycle a Chater-Lea back wheel with forty-eight-tooth sprocket chain wheel attached, as the axle of the two-speed B.S.A. wheel is out of order, and cannot be repaired without a new axle, which is almost impossible to procure. The new rear wheel now fitted to my machine suits it all right, except that the speed of the machine is slow—about twenty miles per hour with the engine running at its best. Is there any remedy for the above defect? The machine ran perfectly before the axle got locked up.—T.J.M.

The only remedy seems to be to fit a smaller chain wheel so as to give you a higher gear. By running on too low a ratio you will cause the engine to wear more rapidly, and also you will use more petrol. About 5 to 1 top should be correct. Alternatively, you might be able to obtain a larger sprocket for the engine-shaft.

**RECOMMENDED ROUTES.**

**BRISTOL TO CHRISTCHURCH.—C.E.W.H.**

Bristol, Pensford, Farrington Gurney, Binegar, Shepton Mallet, Bruton, Shaftesbury, Horton, Ringwood, Christchurch. Approximately 80 miles.

**NEW BRIGHTON TO CHELTENHAM.—W.S.A.**

New Brighton, Birkenhead, Chester, Whitchurch, Hodnet, Wellington, Bridgnorth, Kidderminster, Worcester, Tewkesbury, Cheltenham. Approximately 130 miles.

**SHEFFIELD TO MORECAMBE.—D.B.**

Sheffield, Penistone, Huddersfield, Elland, Todmorden, Burnley, Whalley, Clitheroe, Lancaster, Morecambe. Approximately 95 miles.

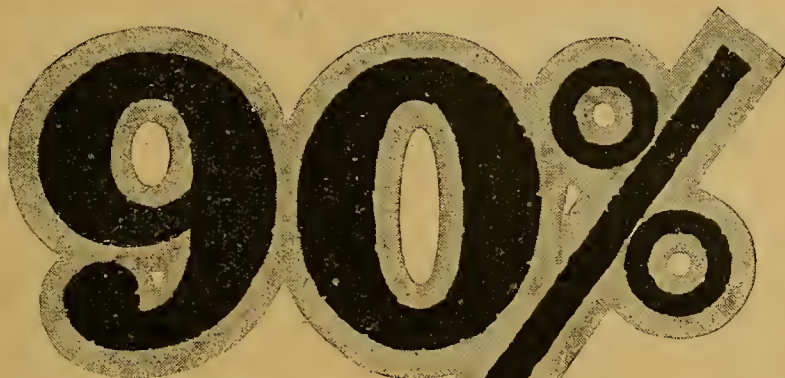
**MAIDSTONE TO WOBURN.—N.G.R.**

Maidstone, Meopham, Gravesend, by ferry to Tilbury, Upminster, Romford, Theydon Bois, Waltham Abbey, Hoddeston, Hertford, Stevenage, Hitchin, Shefford, Amptill, Woburn. Approximately 110 miles.

**SOUTHPORT TO LONDON.—F.J.E.**

Southport, Ormskirk, St. Helens, Warrington, Tarporley, Nantwich, Woore, Stone, Weston, Rugeley, Armitage, Lichfield, Weeford, Atherstone, along Watling Street to Daventry, Weedon, Towcester, Stony Stratford, Fenny Stratford, Dunstable, St. Albans, Barnet, London.





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Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd.**, and crossed

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### A.J.S.

A J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

A J.S. (November, 1916) 4hp. Combination, fully equipped; first cheque £75.—Osborne Cafe, Union St., Swansea. [8613]

A J.S., 1912, 2½hp., rebushed, new cover on back, runs on paraffin; £15/10; good condition.—1, Priory Rd., Kew Green. [8955]

2½hp., 1915 A.J.S., 3-speed gear model, free engine, 24 and h.b.c. clutch, powerful and fast; 40 gns., guaranteed.—Wanchope's, 9, Shoe Lane, London. [8861]

A J.S., 1914 model, and sidecar, 6hp., complete with Lucas lamps, lately overhauled, painted grey; £65; by appointment.—Philpots Garage, Claygate, Surrey. [X6379]

1916 (late) A.J.S., 6hp., 3-speed combination, perfect running order, little used, tyres as new; £28; owner bought car.—Ellis, 62, North Rd., Okehampton, Devon. [8950]

Ch.p. A.J.S. Combination, 3-speed countershaft gear kick start and clutch, all chain drive, in the pink of good condition; £70, including accessories, guaranteed.—Wanchope's, 9, Shoe Lane, Fleet St., London. [8859]

A J.S., 2½hp. (1915), with 3-speed countershaft gear, clutch and kick starter, engine recently overhauled, tyres in good condition; £47/10; extended payments arranged.—Harrods, Motor Showrooms, 119 Brompton Rd., London, S.W.1. [9002]

## For Satisfaction in motor cycle choice

Liberal Exchanges.

Special Payments.

Inspect the best and biggest selection—waiting at P. J. EVANS—among them:

Connaught, 2½ h.p., 2-st....	£28 17 6
Connaught, 2½ h.p., 2-speed ..	38 6
Enfield, 2½ h.p., 2-sp., 2-stroke	42 gns
Enfield, 3 h.p., twin, 2-speed....	55 gns
Enfield Combination .....	90 gns
James, 3½ h.p., 3-speed, twin...	£69 10
James, 4½ h.p., Combination...	86 6
New Imperial, 2½ h.p., 2-speed	40 19
New Imperial, 2½ h.p., clutch	48 6
New Imperial, lady's .....	50 8
Rover, 3½ h.p., T.T., Philipson	66 0
Rover, 3½ h.p., T.T. racer ....	60 0
Rover, 3½ h.p., comb'shft, 3-sp.	77 0
Rover, 3½ h.p., 3-speed Comb.	99 0
Calthorpe-Jap, 2-speed .....	39 18
Calthorpe, lady's, 2-speed .....	37 16
Calthorpe, 3½ h.p., coach Comb.	72 gns

Immediate Delivery.

'Phone: Mid. 662.

Close at 1 on Sats.

Wires: "Lytcar, B'ham."

## Go to P. J. EVANS

87-91 John Bright St. BIRMINGHAM

SEE

## ELITE RUBBER CO. LTD.'S

Column Advertisement in this issue for SPECIAL BARGAINS in TYRES.

## Photography

and focus

Every Wednesday Twopence.

## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### Alldays.

ALLON, new 1916, 2½hp., 2-stroke, 2 speeds; bargain 28 gns.—O., 100, Giffard Av., Swindon. [9000]

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allou 2-strokes. [0791]

ALLON (new), 2½hp., 2-stroke, all models in stock to immediate delivery; the stone-headed lightweight extended payments arranged.—Harrods, Motor Show rooms, 118, Brompton Rd., London, S.W.1. [8995]

ALLON, 1915, 2½hp., 2-speed, hand clutch, new tyre and belt, speedometer, Millers lamps, not done 2,000 miles; £31, or nearest.—24, Farrut Av., Wool Green. [9004]

ALLON, 1915, 2-speed, 2-stroke, pan saddle, £39/10 single speed (new), £36; 2-speed, new, £42; 2-speed and hand clutch, new, £45; extended payments or exchange; Alldays Allon, 1915, 2-speed, Dunlop tyres enamelling and plating good, £30/17/6.—Service Co. 292, High Holborn. [X633]

### Ariel.

ARIEL, 3½hp., 1917, 3-speed countershaft models in stock.—Crow Bros., Guildford. [2562]

COLMORE Depots, Birmingham, Manchester, Liver pool, and Leicester, for Ariel motor cycles. [0791]

ARIEL, T.T., 1914 3½hp., adjustable pulley, net tyres, lamps, horn, newly overhauled; £30.—32 Fosse Rd. North, Leicester. (D) [X665]

ARIEL Combination, 1913-14, 3½hp., 3-speed, decompressor, new Clutch back, spare belt, etc., some petrol; £36.—11, Bollo Lane, Acton Green, W. [X664]

ARIEL, 1913, 3-speed, and clutch, 5.6hp., spin seat-pillar, Dunlop tyres, hood and screen, Lucas lamp and Cowey speedometer; £71/15; extended payments or exchange.—Service Co., 292, High Holborn, London. [X633]

ARIEL (new), 3½hp., 3-speed countershaft gear, clutch and kick starter, decompressor, patent spring seat pillar; £72; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9001]

1914 5.6hp. Ariel Combination, fitted for two fuel separate simultaneous carburetors, Amac and net Binks, many expert's additions and spares, new sprocket chain, and gear case; £50, lowest; exchange light car.—Lt. Ellis, Gosforth, or Greta Green. [X648]

1915 Ariel, 3½hp., 3-speed countershaft gear, kick starter, hand and foot operated clutch, spin seat, mileage 3,000, condition as new, Gloria No. coachbuilt sidecar for same; £55, or separate; would consider 2½hp. A.J.S. or 3½hp. twin James as part payment.—McFarlane, 295, Edge Lane, Droylsden, Manchester. [881]

### Bradbury.

BRADBURY 1913 Combination, N.S.U. 2-speed Bosch Amac, accessories, reliable; £50.—23, Noel folk Rd., Essex Rd., Islington, N. [X638]

BRADBURY, 1912-13, 3-speed, and coach sidecar £35/10; 3½hp., 2-speed, chain drive, £24/10.—Motor Exchange, Horton St., Halifax. [886]

1914 6hp. Twin Bradbury C.B. Combination, 3-speed countershaft gear, quick detachable back wheel lamps, spares; any trial; £40.—J. Thomas, 13, Parre View, Merthyr Tydvil, Glam. [901]

### B.S.A.

COLMORE Depots 261, Deansgate, Manchester, for quickest delivery of B.S.A. [079]

1917 4½hp. B.S.A., chain-cum-belt, 3-speed countershaft, new; £64.—Davenport Vernon and Co., Hix Nycombe. [883]



## MOTOR CYCLES FOR SALE.

## B.S.A.

S.A., 1914, 3½ h.p., 3-speed countershaft, splendid condition, with sidecar and accessories; £46.—Gardner, Oaklands, Winchcomb. [X6569]

S.A., 1913, 2-speed, in splendid order, very little used, just overhauled thoroughly by B.S.A.; any lot; £34.—Telford Garage, 47, Streatham Hill, S.W.2. [8877]

S.A., 4½ h.p., late 1916, and coachbuilt sidecar, chain-cum-belt drive, fully equipped, and in splendid order; 62 gns.—H. Pool, 150, Hurlley St., Burnley. [X6254]

S.A., bought June, 1917, run 500 miles, all chain drive, 3-speed, chain cases, lamps, horn, and spares; a bargain, £50.—Oram, Colin Park, The Hyde, London. [8729]

GENUINE Late 1913 4 h.p. B.S.A., new heavy Dunlop and belt, lamp, horn, clutch, kick start, perfect order and condition, some petrol; £22.—24, Tudor Gardens, Barnes. [9019]

S.A., 1916, 4½ h.p., chain-cum-belt, and Millford sidecar, lamps, horn, etc., in very good condition; £62/10.—Elice and Co., 16-16, Bishopsgate Av., London, E.C.3. [0479]

S.A., 1914, 4½ h.p., all-chain, countershaft 3-speed, Cowey, lamps, Lucas horn, tools, 650x65 tyres, excellent condition throughout; must realise; see no more; seen any time.—S., 23, Innian Rd., Wandsworth, W.18. [9021]

S.A., 1914, 3-speed gear, chain-cum-belt, combination, Phoenix C.B. sidcar, all new tyres, Lucas rear lamp and horn, back lamp, and separate generator, new April, 1915; £49.—W.B., 207, Shirland Rd., Addington, W.9. [8977]

1 h.p. B.S.A. Model K. Nov., 1915, and Canelet 4 sidecar, No. 2, little used, and practically new, 14 hood, lamps, horn, apron, etc.; £65, or exchange for cash for late 3½ h.p. Sunbeam, solo or combination, 4 h.p. A.J.S.—Seen 2, Hortus Maisonnettes, Hortus d., Southall, Middlesex. [8963]

## Calcott.

NALCOTT, 2½ h.p., 1914, Bosch mag., Brown and Barlow carburettor, tyres practically new, all in perfect condition; any trial; £16.—Hancock, Park Gate, Oulton Broad, Suffolk. [8841]

## Calthorpe.

MOLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

17 Calthorpe Junior, 2-speed, as good as new; £26; seen any time.—Bounds' Garage, 223, High Rd., Ilbura. [8887]

NALTHORPE, 1914, 2½ h.p., 2-speed, F.E., perfect, just overhauled; £15.—71, Brookwood Rd., Southalls, S.W. [8839]

17 Calthorpe-Jap, 2½ h.p., Enfield 2-speed gear, Long horn, lamp, done 500 miles only; £35, or latest.—Machin, Ivies, Hereford Rd., Abergavenny. [X6575]

NALTHORPE—1917 models in stock at P. J. Evans, John Bright St., Birmingham, the Birmingham and Midland agent. Two-strokes, four-strokes, and 4-h.p. in J.A.P. combinations, also ladies' models. [8212]

15 2½ h.p. Calthorpe-Jap, Enfield 2-speed, T.T. bar, perfect running order, tyres done 100 miles, lamp, horn, spare belt; real genuine bargain; any expert examination; £24; seen by appointment.—Mont-Ailler, 115, Brecknock Rd., N.19. [X6655]

## Campion.

NAMPION-J.A.P. 8 h.p. Combination, gear box, chain drive, electric lighting, 3 lamps, Swan sidecar, perfect condition; £60.—Harrison, Broad St., Syston, Leicester. [X6644]

## Chater-Lea.

NHATER-LEA No. 7 Motor Cycle, complete, less engine unit, suit 6 h.p. twin; £47/10.—T. Winter, 13, Oak St., Lincoln. [X6609]

h.p. Chater-Lea Combination, 3-speed gear box, wind screen, speedometer, luggage grid, spares, new condition; £58.—Jones, 39, Allen Rd., Peterborough. [X6578]

## Chater-Lea-Jap.

NHATER-LEA-J.A.P., 8 h.p., splendid condition, new 1915, sacrifice £47, must sell; double-seated sidecar, two head lamps, speedometer, bargains.—92, Sydenham Rd. N., Croydon [8865]

## Clyno.

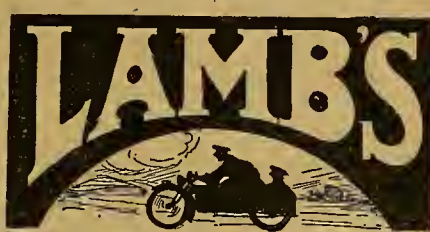
NLYNO War Office Combinations for early delivery from Colmore Depots, Birmingham and Manchester. [8884]

NLYNO 1913-14 Combination, 6 h.p., new condition; cost 115 gns., all accessories, £62.—Tankard and Nith, Ltd., 232, High Rd.; S. Tottenham (near Seven Stars Corner). [8812]

NLYNO, 1913-14, 5-h.p., 3-speed, and sidecar, P. and H. lamp set, Cowey and horn, sidecar complete with spare wheel; £62: 1914-15, 3-speed, 5-h.p., 4 sidecar £69; exchange or extended payments.—Service Co., 292, High Holborn, London. [X6539]

## Connaught.

CONNAUGHT, 1916, 2-stroke, complete with head lamp, generator, rear lamp, horn, etc., only done 100 miles; bargain, £26.—Advertiser, 156, Gt. Portland St., W.1 [8774]



## NEW MACHINES ACTUALLY IN STOCK

MATCHLESS, War Model, 8 h.p. Combination, 3-speed, spare wheel ..... £120 0

MATCHLESS, War Model, 8 h.p. Combination, 3-sp., spare wheel, speedometer, lamp, and horn ..... £125 0

NEW HUDSON V.I.B. Model de Luxe, 4 h.p., 3-speed, de Luxe Sidecar ..... £84 18

JAMES, 1918, 5-6 h.p. twin, quite the latest ENFIELD, 1917, 2½ h.p., 2-speed, 2-stroke, 3 lamps, and horn ..... £44 2

HARLEY-DAVIDSON, 1917, magneto model, bulbous back Sidecar, H.D. .... £130 0

ROVER, 1917, 3½ h.p., 3-speed, countershaft Combination, with Sidecar. Present price £106 4s. 6d.; our price £99 4/6

ROVER, 1916, 3½ h.p., solo mod., lamps, hu. .... £68 10

ARIEL, 1917, 3½ h.p., 3-speed Combination ..... £93 10

LEVIS, 1917, 2½ h.p., 2-speed, Model "E" ..... £47 10

LEVIS Popular Model ..... £32 0

CALTHORPE-J.A.P., 1917, 2½ h.p., 2-speed, Enfield gear ..... £39 16

ALLDAYS ALLON, from ..... £37 10

ROYAL RUBY, all models from ..... £32 10

## SECOND-HAND MACHINES.

ENFIELD, 1916, 6 h.p. Combination, Lucas dynamo set, hood, screen .... £110 0

ENFIELD, 1914, 6 h.p. Combination, lamps, horn; condition A1 ..... £68 10

ENFIELD, 1916, 6 h.p., dynamo equipped, hood, screen, spares as new ..... £105 0

ENFIELD, 1917, 3 h.p., speedometer, Lucas lamps, like new, ridden only few miles ..... £63 0

ENFIELD, 1916, 6 h.p. standard Combination, bought new May, 1917, hood, screen, speedometer, and horn ..... £105 0

TRIUMPH, 1913, 3½ h.p., 3-sp., S.T.T. bars ..... £32 10

TRIUMPH, 1914, 4 h.p., Sturmer-Archer gear, Sidecar, speedometer ..... £48 10

TRIUMPH, 1913, 3½ h.p. solo mod., access. .... £19 10

HARLEY - DAVIDSON, 1915, magneto model, with Sidecar ..... £72 10

HARLEY - DAVIDSON, 1915, magneto model, with Sidecar ..... £68 10

HARLEY - DAVIDSON, 1916, electric model, and H.D. Sidecar, as new ..... £89 10

HARLEY - DAVIDSON, 1915, electric model, and Sidecar ..... £75 0

SINGER, 1913, 4½ h.p., 2-sp., countershaft Combination, cane Sidecar, speedometer, lamps, horn ..... £35 0

ARIEL, 1915-16, 3½ h.p., countershaft Combination, kick-start, speedometer, lamps, horn ..... £72 10

JAMES, 1913, 4½ h.p. solo, with access. .... £22 10

JAMES, 1916, No. 6 Combination, special silencer under Sidecar, speedometer, lamps, horn, and apron, quite as new ..... £75 0

INDIAN Powerplus, 1916, 7-9 h.p., 3-speed Combination, lamps, speedometer, horn. .... £17 10

LEVIS, No. 1, 2-sp., in rather rough condition. .... £23 10

LEVIS, No. 1, 1914, 2½ h.p., single speed, fine condition ..... £23 10

A.J.S., 1914, 6 h.p. Comb., 5 gn. speedometer, 3 lamps, horn, hood, screen. .... £77 10

NEW HUDSON Comb., 3½ h.p., 3-speed ..... £35 0

CONNAUGHT, 1916, 2½ h.p., semi-T.T. bar ..... £22 10

ALLDAYS ALLON, 1915-16, s-sp., access. .... £25 0

O.K.-JUNIOR, 1916, single-speed, 2-stroke ..... £21 0

HAZLEWOOD-J.A.P., 5-6 h.p. twin, and Sidecar, hood, screen, speedometer ..... £53 10

B.S.A. Auto-Wheel ..... £7 10

And another, splendid condition ..... £10 10

We have several New and Second-hand Sidecars from ..... £6 10

PUSH CYCLE DEPT.—We have still an excellent assortment of Ladies' and Gents' Cycles in best makes. Ask for Lists.

WANTED.—MOTOR MECHANIC, r/3 per hour; also Smart JUNIOR for Motor Works.

## LAMB'S,

151, HIGH ST., WALTHAMSTOW, N.E.17. Also at 50, HIGH RD., WOOD GREEN, N.22

Only depot in this district. Phone: Harnsey 1956. Hours—9 to 6, Thursdays, 1 o'clock. 5 minutes Hoe St. (G.E.R.). 25 minutes from Liverpool St. Station. Book to Hoe Street.

## MOTOR CYCLES FOR SALE.

## Connaught.

CONNAUGHT Miniature, single speed, new, £33/17/6; ditto, 2-speed, £41/6/6; standard 2-speed, £44/9; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6341]

## Coventry Eagle.

COVENTRY Eagle, 2-stroke, Villiers engine, as new; £27/10.—Graveson, Balmoral Rd., Liverpool. [X6378]

COVENTRY Eagle, 2-speed, new; 42 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6340]

## Douglas.

DOUGLAS, 2-speed, 1911, Bosch; £13/13.—Finnimore, 553, Cheltenham Rd., Holloway. [8940]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

1914 T.T. Douglas, 2-speed, very fast, all accessories; £36.—228, Cann Hall Rd., Leytonstone. [8948]

DOUGLAS, 1914 T.T., 2½ h.p., 2 speeds, fine condition; many others.—Griffin's, 89, Gt. Portland St., W.1. [8933]

DOUGLAS: prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

COLMORE Depots, Birmingham, Manchester, and Liverpool, and Leicester, for earliest delivery of Douglas motor cycles. [0800]

DOUGLAS, 1914, 2 speeds, clutch, kick starter, guaranteed condition; £32/10.—51, Maplethorpe Rd., Thornton Heath, S.E. [8972]

DOUGLAS, 4 h.p., 2-speed, kick start, C.B. sidecar, perfect; £70.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8913]

DOUGLAS, 1916 (March), 2½ h.p., 2-speed, footboards, and tools, absolutely as new in every way; £43.—Eldridge, Fordingbridge. [8980]

1914 2½ h.p. 2-speed T.T. Douglas and accessories, in good condition; £33/10; seen any time.—Bounds' Garage, 223, High Rd., Kilburn. [8885]

DOUGLAS, 1913, in excellent condition, speedometer, tools, good tyres, lamps; a real bargain, £50.—T.1, ford Garage, 47, Streatham Hill, S.W.2. [8878]

2½ h.p. Douglas, late 1915, 3-speed, and Watsonian 24 sidecar, everything as new, done under 1,000 miles; £50.—Nixon, Brampton, Cumberland. [X6325]

1916 2½ h.p. Douglas, fully equipped, only run 1,000 miles, speedometer, horn, lamps; highest offer over £48.—L. Brocklebank, Manor House, Eton, Windsor [X6377]

DOUGLAS, 2½ h.p., 1914, 2-speed, T.T. bars, good tyres, head lamp, generator, very nice condition throughout; £35/10.—Advertiser, 156, Gt. Portland St., W.1. [8243]

DOUGLAS, late 1915, 2½ h.p. Colonial model, 3-speed, a sound and dirt cheap machine; £37/10.—Longman Bros., King St., Acton. Phone: 1578 Chiswick. [8966]

2½ h.p. Douglas, July, 1914, 2-speed, Lucas lamps and 24 horn, speedometer, many spares, just overhauled, condition as new; £39/10.—Hallows, Milverdale, Dunmow Hill, Fleet. [X6691]

4 h.p. Douglas Combination, 1915-16, 3-speed, clutch, kick starter, Douglas coach sidecar, Jones trip speedometer, horn, all tools; bargain, £70.—Cowan, 32, Fitzroy Sq., London. [X6536]

DOUGLAS Motor Cycles.—We can deliver 1917 Model W on receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol (Wholesale and retail). [9023]

2½ h.p. Model W Douglas, 3-speed, clutch, kick start, purchased new 2 months ago, been few miles only, really new, in perfect order; £58.—Robinson's Garage, Green St., Cambridge. [8989]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 Douglas, 2½ h.p., 3-speed, 37 gns.; 1915 Douglas coachbuilt combination, 4 h.p., 3-speed, clutch, kick-start, 57 gns. (D) [X5976]

DOUGLAS, thoroughly reliable, for £19/10, splendid condition, 1911, enamel as new, very little used since war, over 100 m.p.g., Lucas lamp, horn, and spares, only requires seeing.—Glenthorne, Reading Rd., South Farnborough, Hants. [8822]

DOUGLAS, 2½ h.p., 1914, 2 speeds, complete with lamps, horn, and good kit of tools, just re-enamelled, and in very good order and condition; £37/10; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9003]

2½ h.p. Douglas, absolutely new, immediate delivery of 24 models U, V, and W, clutch, kick-start, against priority permits, for doctors, farmers, war and munition workers. How and where to apply.—For full particulars, write to the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [8988]

## Edmund.

EDMUNDS (new), 2½ h.p. J.A.P. Royal Enfield 2-speed, spring frame, double tank, strongly-built machine; £54/12/6; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9001]



## MOTOR CYCLES FOR SALE.

## Enfield.

ENFIELD Combinations, latest models; 294/10; delivery from stock.—Below.

ENFIELD 5h.p. Twin; 257/10; and 24h.p. 2-stroke. 245; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0858]

ROYAL Enfield 6h.p. 1913-14 Combination; £50.—71, Oaklands Rd., Cricklewood, N.W.2. [8996]

ENFIELD Motor Cycles.—Prompt delivery all models.—P. J. Evans, John Bright St., Birmingham. [8213]

ROYAL Enfield 6h.p. Combination, fast and reliable; £40.—Grover, Woodchester Mills, Stroud, Glos. [X6606]

ENFIELD, 2½h.p., 2 speeds, excellent condition, many others.—Griffin's, 89, Gt. Portland St., W.1. [8954]

ENFIELD Combination, 1914, with Pillion seat; £60, or nearest offer.—W., 277, North Woolwich Rd., Silvertown, E.16. [8954]

ENFIELD Combination, latest 1917, almost new condition; £80, minimum.—Write, 31, Norman Av., St. Margaret's, S.W. [8949]

6h.p. Enfield Combination, twin-cyl. J.A.P. engine, perfect running order; £55, guaranteed.—Wauchope's, 9, Shoe Lane, London. [8864]

ENFIELD Combination, 1914, coachbuilt, nice turn-out; £40, or Douglas and cash.—51, Mapletorpe Rd., Thornton Heath, S.E. [8970]

1916 Enfield, 3h.p., T.T., 2-speed, and accessories, as good as new; £42/10; seen any time.—Bounds' Garage, 223, High Rd., Kilburn. [8886]

SALE or Exchange solo mount and cash, 1916 6h.p. Royal Enfield combination, in good condition.—Offers to H. Baker, St. David's Temperance Hotel, Exeter. [X6642]

LATE 1915 6h.p. Enfield Combination, Bosch mag., electrically fitted, easy starter, done about 5,000, perfect, and in appearance like new; £75.—Ward's, 3, Noble St., E.C.2. [8957]

ENFIELD, 6h.p., late 1914, 2-speed, handle starter, good tyres, coachbuilt sidecar, head lamp, generator, rear lamp, fully equipped, and perfect throughout; bargain, £45.—Below.

ENFIELD, 2½h.p., 1914, 2-speed, kick starter, all chain drive, Enfield grey, good tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout; bargain, £32/10.—Mehes and Mehes, 156, Gt. Portland St., W.1. [7261]

1913 2½h.p. Royal Enfield, 2-speed, free engine, kick starter (a little attention to kick starter), new tyres and tubes, in splendid running order; bargain, £20.—45, Bow Common Lane, E. [8995]

1916 Enfield Combination, 6h.p., Lucas dynamo lighting set and horn, speedometer, mirror, hood, screen, in splendid condition; £105.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552]

ENFIELD 3h.p. Twin, 2-speed, free engine, disc wheels, T.T. bars, sloping tank, very low and sporty, re-enamelled Indian red, new tyres, lamps, horn, machine absolutely like new; a bargain, £38.—Hughes, Whitty, near Chester. [8983]

ENFIELD 6h.p. 1916 Combination, Palmer cord light car tyres all round, large head lamp, generator, rear lamp, luggage carrier to sidecar, very nice condition throughout, and fully equipped; £82/10.—Advertiser, 156, Gt. Portland St., W.1. [7904]

ENFIELD 1915 Combination, 6h.p., 2-speed, clutch, Thompson-Beaumont mag., Amoc carburettor, fitted with lamps, Stewart speedometer, and horn, £87/10; 2½h.p., 2-speed, £20; E.P. or exchange.—Service Co., 292, High Holborn, London. [X6342]

1917 8h.p. Enfield Combination, well run in, and better than new, new spare Palmer cord tyre, back wheel fitted Michelin steel-studded tyre, new lamps, electric tail lamp, wind screen, horn, tools, etc.; £95.—Etheridge, Hillcroft, Gorge Rd., Hurst Hill, near Bilston. [X6224]

TWIN Enfield, 1916, 3h.p., with Canoelet sporting sidecar, and complete with lamps, horn, sidecar apron, and tools, in splendid condition and appearance almost like new; £55; extended payments arranged.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9004]

ENFIELD, 3h.p., late 1914, T.T. Model, with roadster mudguards and handle-bars, tyres almost new, Roman rims and rustless spokes; just been overhauled, everything in first-class condition, 130 m.p.s., has been carefully used and well looked after; £36.—Box 1,299, c/o The Motor Cycle. [X6359]

ENFIELD, June, 1917, 6h.p. combination, Palmer cord light car tyres, lamps, horn, speedometer, clock, reflector, spare tube, luggage grid, fitted with box for spare petrol, handle starter, insurance policy, condition as new; £115, or near offer.—Major Sawyer, R.A., Royal Herbert Hospital, Woolwich. [8563]

ENFIELD 1916-17 6h.p. Dynamo Combination, hood, screen, speedometer, 105 gns.; also 1916 ditto, £105; also 1916 standard model, sold new May, 1917, with hood, screen, speedometer, quite like new, ridden only 3,500 miles, £115; also 1917 3h.p. solo, with 6 gns. speedometer, Lucas lamps, horn, £85; also 1914 6h.p. combination and accessories, tip-top order, £68/10; also 1917 2½h.p. 2-speed model, £44/2; easy payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8900]

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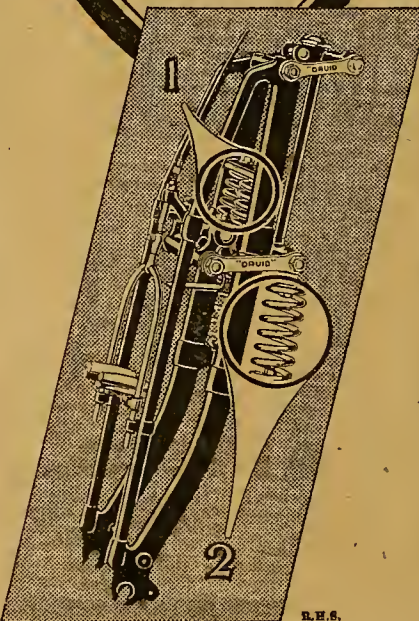
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## MOTOR CYCLES FOR SALE.

## Enfield.

1916 5h.p. Enfield Combination, cost £114 March, 1917, done 1,500, light car tyres, electric lighting, hood, 3-piece screen, Stewart horn, luggage grid, mirror, 70 m.p.s., a most luxurious outfit, as new; 80 gns., or exchange 7-9h.p. Swift, or similar 2-seater, not earlier than 1914.—53, Leagrave Rd., Luton. [8976]

## Excelsior.

EXCELSIOR 7-9h.p. Model de Luxe, electric lighting, complete, new, £85; English built sidecar, 4-point suspension, £17/17.—Davenport Vernon and Co., High Wycombe. [8834]

AMERICAN Excelsior, new 1917 Model de Luxe, 7 h.p., 3-speed, with dynamo electric lighting equipment, speedometer, etc., £85; special coachbuilt sidecar to match, £20; immediate delivery; liberal exchanges.—The Premier Motor Co., Aston Rd., Birmingham. [8975]

## F.N.

F.N., 4-cyl., 1903, 2 speeds and neutral, clutch, mag., tyres good; price £10; will sell parts separately.—L-Sgt. Critchley, 3rd West Yorks, Whitley Bay. [X6582]

## Harley-Davidson.

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for Harley-Davidsons. [0802]

HARLEY-DAVIDSON, 1915½, mileage under 2,000, condition just like new; £70, or offer.—34, Ashvale Rd., Tooting. [8938]

1915½ Harley Combination, 7-9h.p., fully equipped, mileage 2,000, unscratched; £75.—Webb, Belmont, Surrey. Phone: 178. [8928]

HARLEY-DAVIDSON, mag. model, Cooper hubbards back sidecar, new May, 1917; cost £120, sell £100.—Ward, 39, Stainton Rd., Sheffield. [X6643]

1917 Harley-Davidson Combination, new, with 25 gn. sidecar, dynamo lighting, run 10 miles; seen London; nearest £125.—Box 4,843, c/o The Motor Cycle. [9033]

1916 Harley-Davidson Combination, electric model, large roomy and handsome sidecar, machine in perfect order, and practically as new; £95.—Hawkes, 19, Pennard Mansions, Goldhawk Rd., W.12. [8837]

7-9h.p. 1916 Harley-Davidson Combination, complete, electric dynamo lighting, hood and screen, in extra good condition, and mechanically sound; 80 gns., guaranteed.—Wauchope's, 9, Shoe Lane, Fleet St., London. [8888]

RIDER TROWARD and Co., 31 and 73, High St., Hampstead.—T.T. Harley, 7-9h.p., 3-speed, disc wheels, khaki finish, dynamo lighting, as new, 65 gns.; 1915 standard Harley coachbuilt combination, 65 gns. (D). [X5978]

BRAND New and Unused Harley-Davidson, 7-9h.p. Model 11J (electric), fitted with 24 gn. sidecar, tools, spares, and complete with Harley-Davidson 12 months' guarantee; £90.—Box 1,320, c/o The Motor Cycle. [X6686]

HARLEY-DAVIDSON Combination, 1916, not done 2,000 miles, 3 lamps, Klaxon horn, triple Otto screen, brand new heavy Dunlop on rear wheel, other original tyres still unmounted; seen in London.—Capt. Fisher, Beresford Lodge Hospital, Bircington. [8848]

HARLEY-DAVIDSON, 1917 mag. model, with C bulbous back sidecar, hood, screen, £130; also two 1915 mag. combinations, 268/10 and 272/10; also 1915 electric combination, £75; also 1916 electric combination, with genuine H.D. sidecar, £89/10; exchanges, easy payments.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8902]

## Hazlewood.

HAZLEWOOD 5-6h.p. Combination, 3-speed, clutch, kick starter, hood, screen, lamps, horn, speedometer, in splendid condition and appearance; £58; Douglas part.—Wolcot, Burwood Rd., Herasham, Surrey. [8830]

HAZLEWOOD 1915 Combination, 5-6h.p. J.A.P. engine, 3-speed clutch, and kick starter, Lucas lamps, speedometer, special sidecar; £72/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6343]

## Henderson.

HENDERSON, 1914, 10h.p., 4-cyl., coachbuilt sidecar, magnetic speedometer, electric horn, etc., enamelled grey, very smart appearance, and condition as new, all spares; £69; expert examination invited; any trial given.—24, Silchester Rd., W.10. [8821]

## Humber.

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

1914 3½h.p. 3-speed Humber, lamp, etc.; £35, cash or easy terms.—R. E. Jones (Gorages), Ltd., Swansea. [0863]

HUMBER, 3½h.p., 2-speed, kick start, very nice condition, £32.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8632]

HUMBER, 3½h.p., 2-speed, clutch, kick start, perfect; £32.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8914]

HUMBER, 1914-15, 3½h.p. (water-cooled), mag., 3 speeds; 58 gns.—Wandsworth Motor Exchange, Elmer St., Wandsworth (Town Station). [8921]

HUMBER, 1917, 3½h.p. flat twin, new in May, lamps, horn, and tools; £60; owner in army.—Spafford, Whitworth Rd., Rannoor, Sheffield. [X6555]



## MOTOR CYCLES FOR SALE.

## Indian.

INDIAN, 1914, 7-9h.p., fast, powerful, T.T. bars; £25.—Morris, Prince of Wales Rd., Norwich. [8842]  
 INDIAN, 1918, 7-9h.p. clutch model, has been stored for 18 months, as new; £50.—Indian, Bell Hotel, Driffield. [X6534]

INDIAN C.B. Combination, late 1915, 5h.p., 3-speed, speedometer; £60, near offer.—8, Campden Mansions, Notting Hill Gate. [8964]

INDIAN 1916 Powerplus, Model G, 7-9h.p., with Swan sporting sidecar, excellent condition; best offer over £70.—Deards, Ash Villa, Harlow, Essex. [8810]  
 INDIAN 1913-1914 Combination, 2 speeds, spring frame, new chains, good tyres, plenty spares, sound condition; £46.—13, Arklow Rd., New Cross, S.E. [8168]

1914 Indian Combination, 7-9h.p., spring frame, electrically equipped, horn, lamps, speedometer; nearest £60.—5, The Parade, Belmont, Surrey. [8929]

INDIAN, 1916, 3½h.p., 3-speed, clutch, kick starter, electric light, semi T.T., excellent condition; £40.—Mather, Calbeck, Eccleston Park, Prescott, Lancs. [X6560]

T.T. Indian, 7-9h.p., 1915, excellent condition, completely overhauled recently, run about 5,000; £40, or offer, or exchange 7-9h.p. 3-speed.—Meeten, Dorking. [9015]

1914 Spring Frame Indian, 2-speed, F.E., just overhauled, and Phoenix cane torpedo sidecar; £38, or offer.—Motorist, Albany Villa, Martyr Rd., Guildford. [8932]

1914 Indian, 7-9h.p., 2-speed and Milford chassis, lamps, speedometer, horn; special bargain, £38.—E.C. and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [8957]

FOR SALE, 1915 Indian, 5-6h.p., new Phoenix touring sidecar, electric light; £60, or near offer.—J. Collins, 13, Tregarvon Rd., North Side, Clapham Common, S.W.11. [8894]

INDIAN Combination, 7-9h.p., splendid condition, coachbuilt sidecar, electrically equipped, hood and green, late 1915; seen any time; £60.—41, Brighton Rd., Croydon. [8805]

INDIAN and Sidecar, or separate, 5h.p., T.T. clutch model, overhauled, good order throughout, Lucas lamps; £220, quick sale.—Eldridge, 10, West End Lane, W.11. [9009]

INDIAN Powerplus 1916 7-9h.p. 3-speed Combination actually in stock, condition perfect, lamps, horn, speedometer.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8901]

POWERPLUS 1916 7-9h.p. Indian Combination, practically new, condition unscratched; exceptional opportunity to secure the very best; £90.—Telford Garage, 47, Streatham Hill, S.W. [8879]

INDIAN, 1916, 7-9h.p., 3-speed, handsome De Luxe sidecar, only done 900 miles; cost £110; very fast and powerful; sell or part exchange for good 2-seater.—Box 1,317, c/o The Motor Cycle. [X6677]

POWERPLUS Indian, 1916, 7-9h.p. Model G, 3-speed, kick starter, T.T. bars, Stepney, Road Grip tyre on back, splendid condition, fast machine; £56, or nearest.—F. Walker, 21, Hendon Rd., Sparkhill, Birmingham. [X6695]

## Ivy.

Ivy, 2½h.p., 2-stroke, single speed, excellent condition throughout; £25/5; exchange or extended payments.—Service Co., 292, High Holborn, London. [X6344]

## James.

MOLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [8083]

2-STROKE 2-speed James, Lucas lamps and horn, leg guards, Dunlop tyres, all as new; £35.—Neale, Attlecotte, Solihull. [X6629]

1913 4½h.p. James, 3-speed Armstrong, Bosch mag., Lucas tyres as new, head lamp; 30 gns.—Seen 139A, Edgware Rd., London, W.1. [8849]

1914 James 4½h.p. Coachbuilt Combination, 3-speed countershaft, chain drive, Lucas lamps, etc., horn, splendid condition; £40.—Burke, 14, Cyprus St., Globe Rd., Old Ford Rd., E. [9039]

1914 James 4½h.p. Combination, 3 speeds, countershaft, lamps, horn, apron, shield, extra silencer, compressor, drip, low mileage, sound; £50, lowest.—Davis, 18, Laburnum Rd., Bournville. [X6486]

JAMES, the latest 1918 5-6h.p. twin, actually in stock; also 1913 4½h.p. solo model, £22/10, with accessories; also 1916 No. 6 combination, with special silencer under sidecar, speedometer, lamps, and horn, £75, like new.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8898]

## J.A.P.

J.A.P., 4h.p., in good order, with accessories; £18.—Reply, Wood Hall, Hatfield, Herts. [8820]

1914 T.T. J.A.P., just overhauled, replated and enamelled, a very smart lot, £26, or near offer; wanted, 5-6h.p. F.N., 2-speed, free engine, any condition, must be cheap.—Turner, Mount Pleasant, Rowledge, Farnham, Surrey. [8941]

## J.H.

J.H., 2-speed, new; £35/14; extended payments or exchanges.—Service Co., 292, High Holborn, London. [X6345]

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1917 8 h.p. MATCHLESS Combination, new, with spare wheel, W.O. Model	£120 0
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1916 7 h.p. HARLEY-DAVIDSON, electric equipment. Only run about 700 miles	£75 0
1913 6 h.p. REX Combination, fully equipped	£40 0
1917 2½ h.p. ALLON, 2-speed and clutch; cancelled order, cost £50	£44 0
1916 2½ h.p. ALLON, fully equipped	£25 0
1917 2½ h.p. CALTHORPE-J.A.P., new, 2-speed	£39 18
1916 2½ h.p. CALTHORPE-J.A.P.; run 500 miles	£29 10
1914 2 h.p. CALTHORPE JUNIOR, 2-sp.	£17 10
1912 2½ h.p. A.J.S., 2-speed and Sidecar, fully equipped	£26 0
1911 3½ h.p. T.T. TRIUMPH, with Philipson pulley	£21 0
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150, almost new Sidecar, speedometer, watch, carrier seat, in new condition and overhauled	£75 0
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Matchless and almost new Bramble Sidecar, fine lot, good order, mechanical horn, good lamp set	£42 10
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Near offer.

37, Turnham Green Terrace  
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 LONDON, W.



## MOTOR CYCLES FOR SALE.

## J.H.

J.H., 1917, brand new, 2½h.p., 2-speed, 2-stroke, countershaft; 42 gns.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8919]

J.H., 9h.p. M.A.G. engine, Jardine 4 speeds, free engine, and new coachbuilt Bramble sidecar; £75.—Motor Exchange, Horton St., Halifax. [8867]

## Lea-Francis.

LEA-FRANCIS (late), with coachbuilt sidecar, twin J.A.P., mag., 2 speeds, kick, countershaft; 59 gns; exchanges entertained.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [8922]

1914-15 Lea-Francis (with light sidecar if desired), 4h.p. twin J.A.P., Bosch, Amac, 2-speed, and foot clutch speedometer, full accessories, in first-class condition; £44; solo.—28, Mitcham Rd., Tooting Broadway. [9013]

## Levis.

2½h.p. Baby Levis, £17; appointment.—13, Hemington Av., New Southgate, N.11. [8956]

MOLMORE Depots, Birmingham and Leicester, for delivery of Levis motor cycles from stock. [8084]

LEVIS, 2½h.p., late 1915, first-class condition, new tyres and belt; £22, bargain.—5, Norwich Rd., Ipswich. [8960]

LEVIS, 2½h.p., No. 1 Model, 2-speed, chain-cum-belt drive, rubber studded tyres, brand new, in stock for immediate delivery; reduced price £44.—Mebs and Mebs, 156, St. Portland St., W.1. [7564]

LEVIS Popular, £32 and £47/10; delivered immediately; also 1914 No. 1 single speed, with accessories, £23/10; and No. 1 with 2-speed, in rather rough condition, £17/10, real bargain.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8905]

## Matchless.

CROW Bros., Guildford, have a new Matchless War Office combination in stock. [8872]

MATCHLESS Motor Cycles from stock at Colmore Depots, Birmingham and Manchester. [8081]

1914 Matchless Combination, 8h.p. M.A.G. engine, speedometer, lamps, electric horn, luggage grid, in fine order; £70.—Below.

1917 Matchless Combination, war model, 8h.p., 3-speed, detachable wheels, spare wheel, new; £120.—E.C. and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [8492]

MATCHLESS Combination, 1918, M.A.G. engine, 3 speeds, kick start, hood, wind screen, like new; £67.—34, Ashvale Rd., Tooting. [8939]

7h.p. 1915 Matchless Combination, in excellent condition, all tyres nearly new; price £70.—Haynes Bros., Ltd., 14, King St., Maidstone. [8982]

MATCHLESS Combination, 1915, 8B, M.A.G. engine, lamps, horn, Stewart speedometer, hood, spares, etc.; £75.—O., 273, Cavendish Rd., Balham. [9007]

MATCHLESS 1917 Combination, 8h.p., 3-speed, clutch, and kick starter, detachable wheels, including spare wheel, new; £120; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6346]

1914 8B Matchless Combination, 7h.p. M.A.G. engine, countershaft gear, Lucas lamps, screen, speedometer, all in good condition and perfect running order; £65.—Pots, 20, Salisbury Terrace, Devonport. [X6579]

MATCHLESS (two) 1917 8h.p. J.A.P. Combinations actually here, £120 and £125 respectively, spare wheels in both outfits; extended payments, exchange.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8897]

MATCHLESS Combination, 1917, 8B2, 8h.p. M.A.G., 3 speeds, Matchless grey finish, shock absorber on engine-shaft, sprung sidecar with spare wheel and tyre, never been ridden; can be seen by appointment; £125, or best offer.—66, Howarth Rd., Plumstead, S.E.18. [8850]

## Minerva.

MINERVA, mag. Ignition, running order; £6.—Particulars by post, Barnes, Store St., Haslingden. [X6568]

3½h.p. Minerva, m.o.t., mag., new belt, Brampton 32 gear; £13, or exchange for Baby Levis and cash.—1, Pleasant View, Darcy Lever, Bolton, Lancs. [X6563]

## Moto-Reve.

MOTO-REVE, 1914, 2½h.p. twin, perfect, nice machine; £15/10.—Jones, 9, The Broadway, Barnes. [8840]

## Neall.

NEALL, 1915 2-stroke, 2½h.p. Peco engine, 2-speed, lamps, accessories; £23.—Box 1,311, c/o The Motor Cycle. [X6482]

## New Hudson.

NEW Hudson, 1914, 6h.p., 3-speed sidecar combination, very fine condition; £59/10.—Motor Exchange, Horton St., Halifax. [8869]

NEW Hudson 6h.p. Twin, 3-speed, coach sidecar, all accessories; £60; perfect.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8915]

1914 4h.p. New Hudson Combination, 2-speed, clutch, lamp, horn, spares, 2 new tyres, just overhauled; £40.—Walker, Blake Hall, Ongar. [9027]



## MOTOR CYCLES FOR SALE.

## New Hudson.

NEW Hudson, 1913, 3½ h.p., 3-speed, clutch, in good running order; £34/15; exchange or extended payments.—Service Co., 292, High Holborn, London. [X6347]

NEW Hudson.—We have the latest 1917 3-speed 4 h.p. combination, fawn finish, handsome and economical outfit, £84/18; also 1913 3-speed combination, at £35; really nice lot.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8904]

## New Imperial.

NEW Imperial, 1917, 2½ h.p., 3½ h.p., 6 h.p. models, in stock.—Crow Bros., Guildford. [2563]

NEW Imperial, 1916, 2½ h.p., 2 speeds, lamps, speedometer, many others.—Griffin's, 89, Gt. Portland St., W.I. [8935]

NEW Imperial-Jap, 1916, 2½ h.p., 2-speed, kick start, perfect; £44.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8920]

1915 New Imperial, 2½ h.p., 2 speeds, variable mag., lamps, and horn; £22.—Leighton, York Terrace, Chester-le-Street, Co. Durham. [X6692]

1917 Brand New 8 h.p. New Imperial, War Office Model, and coach sidecar; 109 gns.—Motor Exchange, Horton St., Halifax. [8868]

NEW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [80839]

IMPERIAL-J.A.P., 1916, 2½ h.p., 2-speed, 4-stroke, kick start, perfect; £47.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8691]

NEW Imperial (new), 2½ h.p., 2-speed; £40/19; actually in stock for immediate delivery; extended payments arranged.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [8998]

NEW Imperials, 1917 models in stock; 2½ h.p. model, J.A.P. engine, 2 speeds, 39 gns.; also clutch models with kick starters, one shop-sold 2-speed model, 36 gns.—P. J. Evans, John Bright St., Birmingham. [8214]

2½ h.p. 1916 New Imperial-Jap, only ridden 300 miles, just as new, 2-speed countershaft gear, h.b.c. clutch, kick starter, and all best accessories, complete for the road; £40, guaranteed.—Wauchope's, 9, Shoe Lane, London. [8860]

NEW Imperial 8 h.p. J.A.P. Overseas War Office combinations, as described in detail pages 252-3, Sep. 13th issue of this paper, exceptional machine in every detail; immediate delivery from stock; £114/9.—Colmore Depot, Distributors, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [80866]

## Norton.

1916½ T.T. Norton, 4 h.p., absolutely as new, unscratched, lamps, horn, speedometer; £50.—Webb, Butcher, Belmont, Surrey. [8930]

1916 Norton, T.T., 3½ h.p., lamps, horn, just overhauled; £45.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0480]

LATE 1915 Big Four Norton, chain-belt model, in quite new condition, new tyres, fully equipped, splendid sidecar machine; what offers (none under £55 entertained); Northern county.—Box 1,302, c/o The Motor Cycle. [X6381]

T.T. Norton, 3½ h.p., 1915, Binks (also B. and B.), Lucas lamps, 2 generators, Jones speedometer, 100 m.p.g. and 65 m.p.h., tyres good, 2 spare belts, tank enamelled black and gold, machine in excellent condition; £40.—86, Waverley Rd., Southsea. [8819]

1916 3½ h.p. Norton and coachbuilt sidecar, 3-speed Sturmev-Archer countershaft, P.H. lamps and generator, horn, Stewart speedometer, tyres good, Henderson sidecar with disc wheel, and is in new condition; £65.—Frederick Kirk, Southwell Rd., Rainsworth, near Mansfield, Notts. [8931]

## N.S.U.

N.S.U. 6 h.p. Combination, 2 speeds, clutch, large underslung steel sidecar; any trial; £17.—Shear, 35, Goldsmith Av., Manor Park. [9018]

HAVING Acquired the entire stock-in-trade of the N.S.U. Motor Co., Ltd., we can now supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Eagles and Co., Acton Hill Works, Acton, W.3. [X6653]

## O.K.

O.K. Juniors.—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn [9010]

O.K. Junior, 1916, Mark V., practically new condition, perfect; £22.—Pearce, Avenue, Blackheath, S.E.3. [X6658]

## P. and M.

P. and M., 3½ h.p., 2 speeds, and underslung sidecar; £22/10.—Motor Exchange, Horton St., Halifax. [8873]

1914 P. and M. and Canelet coachbuilt sidecar, in perfect condition, well equipped; £45.—21, Boscastle Rd., Highgate, N.W. By appointment. [8884]

1912 P. and M. and Millford sidecar, smart appearance, very reliable, tyres good, lamps, horn, tools, spare valve and chain; £30.—Old Bank, Ascot. [9025]

6 h.p. P. and M. Combination, 90° twin engine, P. and M. coachbuilt sidecar, speedometer, etc., fine turn-out; £75.—Farrar's Motors, Hopwood Lane, Halifax. [9037]



## SIDECAR COMBINATIONS.

DOUGLAS, 4 h.p., 1915, 3-speed Combination, 3 lamps, horn, speedometer ..... £66 0  
INDIAN, 7-9 h.p., 1915, 3-speed, spring frame, Millford Sidecar to match, all accessories ... £55 0  
CLYNO, 6 h.p., 1914, khaki finish, detachable wheels, 3-speed ..... £65 0  
EXCELSIOR, 8-10 h.p., 1915, 3-speed, coachbuilt Sidecar, electric lighting ..... £48 0  
HUMBER, 8-10 h.p., 3-speed, handle starting, coachbuilt Sidecar, all accessories ..... £80 0  
J.H., 8 h.p. M.A.G. engine, Millford Sidecar ..... £80 0

## SOLO MOTOR CYCLES.

SCOTT, 1914, 3½ h.p., 2-speed, and kick-start, just being overhauled ..... £28 0  
RUDGE 3½ h.p. Multi, tyres like new, pedal-starting ..... £28 0  
DOUGLAS, 1914, 2½ h.p., P.H. head lamp ..... £24 0  
LUGTON, 1915, 3½ h.p., good tyres, fine solo mount. Cheap ..... £22 0  
REX 4 h.p. de Luxe, 2-speed, and handle-start, 2½ in. tyres, spring forks ..... £22 0  
RUDGE, 1912, 3½ h.p., fixed gear; very fast ..... £21 0  
CALTHORPE, 1915, 2-speed, 2-stroke, adjusted to run on paraffin ..... £22 0  
ALLDAYS MATCHLESS, 2½ h.p., 2-speed, 2-stroke, requires assembling ..... £15 0

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## MOTOR CYCLES FOR SALE.

## Precision.

1914-15 3½ h.p. Precision, 3-speed, free engine, clutch excellent condition; £30.—Betts, 44, Rectory Rd Stoke Newington. [8995]

## Premier.

3½ h.p. Premier Late 1913 Combination, damaged but fine, all parts complete, spares, and accessories any reasonable offer.—Buck, A.S.C., Ripon. [8991]

PREMIER, late 1914, 3½ h.p., 3-speed countershaft kick starter, in very good condition; price £45.—P. Loverock, Moat Hall, Newborough, Burton-on-Trent [X564]

## Quadrant.

QUADRANT, 4½ h.p., 1916, 3-speed countershaft coach sidecar; £60.—W. and H. Motor Co., Ltd. 287, Deansgate, Manchester. [8991]

QUADRANT, 3½ h.p., new belt and tyre, good tubes Simms-Bosch mag., in good condition; £11.—G. McConloch, Burncourt, Clogheen, Co. Tipperary. [881]

QUADRANT, 1915, 4½ h.p., 3-speed, B.S.A. countershaft clutch, all chain, Ivy coachbuilt sidecar, perfect; £45.—Probert, 45, Tame Rd., Witton, Birmingham. [X567]

## Rex.

REX Combination, 6 h.p., 2-speed, new 1916; mileage 500; a bargain, £50.—Willow Cottage, Elland. [882]

3½ h.p. Rex (1912), Bosch, new piston and tyre, smart bargain, £15.—Apply, Dalston, Sheepcote, Woodhorn Common, Bucks. [8899]

REX, 3½ h.p., overhauled, rebushed, Ruthardt mag., in perfect running order; £8, lowest.—11, Bolls Lane, Acton Green, W. [X565]

REX, 3½ h.p., single, Simms-Bosch mag., B. and B. carburettor, starts petrol, runs paraffin; £10/10.—Box 1,324, c/o The Motor Cycle. (D) [X669]

REX, 6-8 h.p., 1914, and sidecar, 3-speed gear, handle clutch, kick starter, lamps, dissolved acetylene; £35.—Capt. Holt, 16 O.C.B., Kimmel Park, near Rhyl [X566]

REX, 1914, 6 h.p., T.T., newly enamelled and plated, speedometer, horn and lamps, as new, quick sale, £27/10.—After 7.30 p.m., 22, Blythwood Rd., N.4. [9031]

MOTOR Cycle, 6 h.p. Rex, 1912, Mabon clutch, handle start, fast machine, Dunlop tyres, all in perfect condition, accessories; offer; must sell; seen by appointment only.—J., 113, Amesbury Av., S.W.2. [8807]

REX 1913 Combination, fine coachbuilt sidecar, fully equipped, 5-6 h.p., very fast and powerful; any trial; £30; would accept lightweight part.—Bunting's, Motor Exchange, Mousons Av., Harrow. [8911]

## Rover.

COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [8882]

ROVER, 3½ h.p., mag., B.B. carburettor, spring forks overhauled.—152, Camberwell Grove, Camberwell. [8880]

ROVER, 1916, 3½ h.p., 3-speed, countershaft, clutch, speedometer; £59.—Griffin's, 89, Gt. Portland St., W. [8936]

ROVER Brand New 1917 3½ h.p. Combination, actually in stock, or sell as solo, countershaft gears.—Rose's Garage, Uxbridge. [8893]

ROVER Motor Cycles; immediate delivery latest 3½ h.p. variable gear and T.T. models.—P. J. Evans, John Bright St., Birmingham. [8215]

ROVER, 1914, 3½ h.p., T.T. Model, with Philipson pulley, very smart condition; £29/10.—Motor Exchange, Horton St., Halifax. [8871]

3½ h.p. Rover, Amac, Bosch, new belt, Michelin tyres, 32 fast, perfect; any trial; £12.—Nelson, 470, Wandsworth Rd., London, S.W. [9026]

ROVER, 1915, 4 h.p., 3-speed, Dunlop combination tyres, lamps, horn, speedometer, and all accessories, in perfect condition; £42.—13, Basilidon Rd., Plumstead, S.E. [8811]

ROVER, 1915, 3½ h.p., Philipson pulley, T.T., original tyres, very fast, spare belt, lamps, etc.; good reason for selling; nearest offer to £40.—Clark, Offchurch, Leamington [X6380]

ROVER, 3½ h.p., late 1916, 3-speed countershaft, kick starter, head lamp, generator, rear lamp, very nice mount, perfect throughout; £55.—Meles and Meles, 156, Gt. Portland St., W.1. [8833]

ROVER, 3½ h.p., Dec., 1913, N.S.U. 2-speed, not used last two years, B. and B., Lucas head and tail lights, tyres good, fitted Paragon cane sidecar, in perfect condition; £28.—267, Lyham Rd., Brixton Hill, S.W. [8829]

ROVER 1917 3½ h.p. Combination actually here, our price £39/4/6, present day price £106/4/6; also brand new 1915 3½ h.p. solo, with lamps, horn, bargain at £68/10; easy payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [8899]

## Royal Ruby.

ROYAL Ruby, 1914, 2-stroke, perfect condition, single gear; £23.—Shepherd, Station House, Kensley. [8827]

ROYAL Ruby, 1916, new, 2½ h.p., Albion 2-speed gear, 2-stroke model; £36/10.—Davenport Vernon and Co., High Wycombe. [8835]



## MOTOR CYCLES FOR SALE.

## Royal Ruby.

ROYAL Ruby, 1916, new, 2½ h.p., Albion 2-speed gear, 4-stroke model L; £39/10.—Davenport, Verdon and Co., High Wycombe. [8636]

ROYAL Ruby, 1915 model, 2½ h.p., 2-speed, Dunlop tyres, lamp, horn, and tail lamp, condition as new; £25.—The Premier Motor Co., Aston Rd., Birmingham. [8979]

## Rudge.

RUDGE Multi, 5-6 h.p., very powerful, very fine cosch sidecar; £45.—Motor Exchange, Horton St., Hallifax. [8870]

RUDGE Multi, 3½ h.p., 2-speed, sidecar; bargain, £35.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8917]

1917 Rudge Multi, 3½ h.p., mag., lamps, new; 50 gas.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [8923]

1915 Rudge, clutch, 1915 B. and B. carburettor, new back tyre, good condition; £17.—M. F. Deeping, Forthlands, Sandpit Lane, St. Albans. [86585]

1916 3½ h.p. I.O.M. Rudge, T.T., condition excellent, Lucas horn, tools; £30, or near offer; appointment.—Doravston, 37, Orford St., Wavertree, Liverpool. [86657]

RUDGE Multi, 3½ h.p., 1914, thoroughly overhauled, new 1916 cylinder, piston, and other parts, fully equipped, splendid sidecar or solo machine; £35.—Car-enter, 52, North Bar, Baubury. [86637]

## Scott.

SCOTT, 1914 model, with Montgomery sidecar, everything complete, mileage under 6,000; £50.—Ashforth, Printer, Waterfoot, near Manchester. [86612]

SCOTT, 1914, 3½ h.p., 2-speed, Bramble coachbuilt sidecar, Stewart speedometer, lamps, horn, etc.; 45.—Wilkins, 7, Gorrage Park Parade, Tooting Junction, S.W.17. [8889]

SCOTT, 1913, C.B. sidecar, good condition, tyres and chains perfect, lamps, horn, etc.; £35; exchange for old lady's and gent's cycles and cash.—Cpl. Tavianer, M.T.S., Bhurtpore, Tidworth. [8979]

SCOTT, 1914, and sidecar, 2-speed, kick starter, 2-cyl., 2-stroke, Binks carburettor, Stewart speedometer, Palmer cord tyres; £55; extended payments or exchange.—Service Co., 292, High Holborn, London. [86350]

## Service.

SERVICE, 2½ h.p., 2-stroke Peco engine, chain and belt drive, 1915, a very reliable proposition, 2-speed, Harcourt extra cooling fins; £35; extended payments or exchange.—Service Co., 292, High Holborn, London. [86348]

## Singer.

SINGER, 2½ h.p., late 1915, clutch model, only done 500 miles; £27, offers, or exchange.—273, High St. North, East Ham. [8992]

## Sparkbrook.

SPARKBROOK 22in. Cycle, fitted with 1½ h.p. engine, in good going order, hardly used, 100 to allan; price £10.—N.A.G., 187, Harwoods Rd., Welford. [8958]

## Star.

1914 Star, 4½ h.p., mag., 3 speeds, countershaft; 29 gas.—68, Elmleigh Rd., Wandsworth. [86628]

## Sun.

1916 Sun 2-stroke, for sale, not done 200 miles; price £22.—McCauley, Nyan. [86574]

SOLMORE Depots, Birmingham and Manchester, for delivery from stock of all models of Sun motor cycles. [8907]

SUN-VILLIERS 2-stroke, 1915, 2 speeds, Klaxon, speedometer, little used; £22.—51, Maplethorpe Rd., Thornton Heath, S.E. [8969]

SUN-VILLIERS, 2-speed, new, £37/16; V.T.S. single speed, new, £30/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [86352]

SUN Combination, 6 h.p. twin, Bosch mag., 3-speed Starmey-Archer, free engine, kick start, large cone sidecar; trial; £45; exchange piano player.—Hunt, Vittle. [8804]

## Sunbeam.

SUNBEAM 1917 3½ h.p. Combination, War Office Model, practically new; £105.—Box 1,316, c/o The Motor Cycle. [86651]

SUNBEAM 1917 3½ h.p. Combination, all accessories, new condition, little used; £85.—Cloveley, Short-leath, Farnham. [86382]

3½ h.p. Sunbeam Combination, 1916, Lucas lamps, 32 horn, speedometer, perfect condition; £85.—Turner, Narborough. [86635]

SUNBEAM 3½ h.p., 1916 Military Model, as new, not ridden 100 miles; cost £80, accept £72.—No. 312, c/o The Motor Cycle. [86561]

3½ h.p. Sunbeam Combination, 3 speeds, clutch, kick 32 starter, and all accessories; £55, guaranteed.—Vauchope's, 9, Shoe Lane, London. [8862]

1916 Sunbeam Combination, 8 h.p. M.A.G. engine, Lucas lighting (accumulator), screen, luggage rack, mudshields, absolutely in perfect condition throughout; £122.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551]

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## Sunbeam.

SUNBEAM, late 1914, fully equipped, Bosch, Lucas, Danlops, all as new; £50; warranted not run 8 months. Box 1,325 c/o The Motor Cycle. (D)—(Advertiser please send address.) [86690]

1915 3½ h.p. Sunbeam, 3-speed, hand controlled clutch, kick start, engine perfect, exactly as latest model; £60.—Robinson's Garage, Green St., Cambridge. [8990]

1916 Sunbeam, 3½ h.p., semi T.T. bars, black and gold, 3-speed hand-controlled clutch, nearly new, few miles only, perfect condition, with lamps, mechanical horn.—Robinson's Garage, Green St., Cambridge. [8987]

## T.D.C.

DE LUXE T.D.C., 1916, 2½ h.p., overhauled, perfect; £23.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8918]

## Torpedo.

2½ h.p. Torpedo-Precision, scarcely soiled, runs fine on 2½ paraffin, reliable business machine; £27, no offers.—Noble, 175, Lea Rd., Gainsborough. [86580]

## Triumph.

TRIUMPH, 3½ h.p., Philipson pulley, late 1912; 18 gas.—66, Greyhound Lane, S.W.16. [8994]

TRIUMPH, 1912, clutch, in good condition; £25.—A. C. Walker, 90, Elsinore Rd., Forest Hill. [8846]

1914 Triumph, 3-speed, underslung C.B. sidecar, accessories; £45.—Lumb, Oak Terrace, Halifax. [86384]

TRIUMPH, 1911, 3½ h.p., T.T., free engine, Danlops, paraffin; bargain, £16/16.—30, Homestead Rd., Fulham. [8911]

TRIUMPH, with sidecar, 3½-4 h.p., mag., 2 speeds; £23/10.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [8924]

1910 3½ h.p. Triumph, powerful engine, perfect condition, guaranteed; a bargain at £16/10.—Box L4,834, c/o The Motor Cycle. [8838]

TRIUMPH, 4 h.p., and wicker sidecar, 3-speed, 1914, all accessories, perfect condition.—Smith, Swan, Tenbury Wells, Worcestershire. [8959]

TRIUMPH, 3½ h.p., Roc 2-speed gear, and sidecar, £26/10; 1911 3½ h.p. touring model, £22/10.—Motor Exchange, Horton St., Halifax. [8872]

1916 Countershaft Triumph, Lucas lighting set, horn, Bonniksen's speedometer, guaranteed perfect; £70.—Jones, Withyhold Farm, Cheltenham. [86627]

1913 Triumph, 3-speed, semi-T.T., 2½ h.p. Danlops (as new), recently renovated; bargain, £31; approval.—St. Buenos, Beaconsfield Rd., Coventry. (D) [86696]

1915 Triumph, 4 h.p., countershaft, lamps, horn, speedometer, excellent condition; £58.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481]

1914 Triumph, 4 h.p. T.T. clutch model, complete splendid condition, very fast, recently overhauled new bearings; bargain, £30.—E. Vickers, Barnethy, Lincolnshire. [8854]

1910 3½ h.p. Standard Triumph, free engine clutch, Bosch mag., speedometer, lamps, and horn, guaranteed perfect; £25.—The Premier Motor Co., Aston Rd., Birmingham. [8975]

TRIUMPH, late 1913, 3-speed model, and clutch, fully equipped with lamps, good condition, greatest bargain offered in Triumphs for weeks; £27/10.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [8965]

TRIUMPH, late 1911, 3½ h.p., clutch model, fine condition, brand new Dunlop tyres and tubes, new Dunlop belt, Lucas lamps and generator, Stewart speedometer, horn, mirror, pump, and all tools; £21.—Smith, 16, Haverstock Hill opposite Chalk Farm Tube Station. [9023]

TRIUMPH Combination, 1916 (Xmas), 3-speed countershaft, Lucas King of the Road lamps and horn, Bonniksen speedometer, watch, Mills-Fulford sidecar, hood and screen (side wings) fitted last month, beautiful outfit, mileage 3,500; price £85.—Tipper, Mill St., Brierley Hill, Staffs. [86630]

RIDER TROWARD and Co., 31 and 73, High St. Hampstead.—1917 countershaft Triumph, in stock, 76 gas.; 1915 Triumph combination, 20 gas. sidecar, 52 gas.; 1914 Triumph coachbuilt combination, 47 gas.; 1914 Triumph, 4 h.p., 3-speed, 39 gas.; 1913 T.T. Triumph, 23 gas. (D) [85989]

£42; it's cheap.—1914 Triumph combination, 3 speeds, clutch, kick starter, electric horn, 2 head lamps, car generator, tools, spare valves, tube, belt, etc., beautifully upholstered, coachbuilt underslung sidecar, machine in perfect condition, like new throughout, unused last two years; would separate.—136, Dalnally Rd., Croydon. [9020]

TRIUMPH, 1913, 3½ h.p., clutch, Dunlop tyres, enamelling and plating good, £23/10; 1914, 3-speed, clutch, just been renovated by the Triumph Co., complete with sidecar, Cowey, P. and H. lamp set, and horn, £45/10; Triumph and sidecar, £21; 1912-13, Starmey F.E. clutch, £28/15; 3½ h.p., fitted to run on substitute, enamelled red, £19; extended payments or exchange.—Service Co., 292, High Holborn, London. [86351]

## Werner.

2½ h.p. Werner, just overhauled, rebushed, battery in condition; quick sale £27, or offer.—V. Buckland, Pal Mall, Breadsall, Derby. [86632]



## MOTOR CYCLES FOR SALE.

Wolf.

1915 Wolf, 2½ to 3 h.p., 2-stroke; quick sale £15.—Crow Bros., Guildford. [8831]

Zenith.

1917 Zenith 5 h.p. and Millford sidecar, nearly new, and in perfect order; £90.—Elce and Co., 15-16, Bishopsgate Ave., Camomile St., E.C.3. [0491]

ZENITH 1914 4-5 h.p. Combination, nearly new heavy tyres and belt, lamps, and all accessories, very good condition: £52.—126, Headstone Rd., Harrow. [X6656]

ZENITH, 1915, 5 h.p. twin, mag., countershaft, kick, lamps, most beautiful machine; bargains, 50 gns.; easy terms arranged.—Wandsworth Motor Exchange, Elbaer St., Wandsworth (Town Station). [8925]

ZENITH-GRADUA (July, 1916) 6 h.p. Combination, lamps, horn, speedometer, little used, guaranteed sound: £73 cash; would exchange with cash for late w.c. Morgan.—Hampton, 580, Bristol Rd., Northfield, Birmingham. [X6567]

Ladies' Motor Cycles.

LADY'S Model Metro, 2-speed, new: £36/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X6353]

LADY'S Douglas, 2½ h.p., 2 speeds, fine goer, good tyres; sacrifice £25.—Farrar's Motories, Hopwood Lane, Halifax. [9038]

LADY'S New Imperial, 2-speed, kick start, hand clutch, new July, 1917; cost £50/8; must sell; accept £43.—Miss Firth, 5, Abbotford Grove, Timperley, Cheshire. [8561]

O.K. Junior, Mark III., fitted with clutch, 2-speed gear, electric lamps, A.J.S. spring saddle-pillar, Stewart speedometer and horn, run about 1,200 miles only; illness reason of selling; cost £56, accept £40, or near offer.—34, Howard Rd., Dorking. [9014]

Miscellaneous.

BOOTH'S Motories, Portland Place, Halifax.—De-tailed list of motor cycle bargains free.

HARLEY-DAVIDSON, 7-9 h.p., fitted with grey coachbuilt sidecar; £69/10.—Booth's Motories.

TRIUMPH, 1910, free engine, T.T. bars, good tyres; £18/10.—Booth's Motories, Halifax.

BRADBURY, 4 h.p., 1911, Grado gear, coach sidecar, with screen; £25/15.—Booth's Motories.

TRIUMPH, 1911, free engine model, in nice condition; £21/15.—Booth's Motories, Halifax.

REX, 6 h.p., 1909, mag., spring forks, good tyres; £13/15.—Booth's Motories, Halifax.

REX, 6 h.p., 1911, m.o.v., N.S.U. 2-speed; £18/15.—Booth's Motories, Halifax.

SINGER, 3½ h.p., 1913, 3 speeds, £12/12 coach sidecar; £31/10.—Booth's Motories, Halifax.

PREMIER, 3½ h.p., 1911, 3-speed gear, Bosch mag.; £21/10.—Booth's Motories, Halifax.

SUN-VILLIERS, 2-stroke, 2½ h.p., 1914, nice condition; £16/15.—Booth's Motories, Halifax.

RUDGE Multi, 3½ h.p., 1914, T.T. model, enamelled red; £29/15.—Booth's Motories, Halifax.

SPECIAL Bargain.—3½ h.p. Triumph, 1910, free engine model; £16/10.—Booth's Motories, Halifax.

SUNBEAM, 1915, 6 h.p., detachable wheels, sidecar, lamps, speedometer; £89.—Booth's Motories, Halifax.

ZENITH, 5 h.p., 1914, Zenith gear, nice coach sidecar; £48/15.—Booth's Motories, Halifax.

WOLF, 2½ h.p., 1916, 2-stroke, 2-speed, nice condition; £26/15.—Booth's Motories, Halifax.

CALTHORPE-J.A.P., 2½ h.p., 1915, Enfield 2-speed, £25/15; O.K., 2½ h.p., 1914, 2-speed, £20.—Booth's Motories, Halifax.

NEW Hudson, 3½ h.p., 1912, 3-speed, wants attention; £13/15; splendid 1910 3½ h.p. Rex, £12/10.—Booth's Motories.

RUDGE Multi, 3½ h.p., 1913, with Millford sidecar, £29/15; S.P.K., 3½ h.p., countershaft 3-speed, chain drive, coach sidecar, £19/15; A.C. Sociable, 1911, £23/15.—Booth's Motories, Halifax. [8592]

FARRAR'S.—6 h.p. P. and M. combination, 90° twin engine, Bosch, P. and M. coachbuilt Projectile sidecar, fine turnout; £75.

FARRAR'S.—Lady's Douglas, 2-speed model, fine goer, good tyres; £25.—Farrar's Motories, Hopwood Lane, Halifax. [9036]

TRIUMPH 2-stroke, new October, 1915, scarcely used, £35; also 1913 Rudge Multi combination, new tyres and belt, very good order, £26.—Smith, Old Kays, Turtoo Rd., Tottington, Lancs. [X6621]

2½ h.p. Moto-scoche, Bosch mag., m.o.v., leather belt, low machine, in good condition throughout, bargain, £11; also 1910 3½ h.p. Triumph, 2-speed, good machine, £25 offers.—Turley, 1, Lampard Place, High St., Rasthall, Kent. [8953]

SECOND-HAND Motor Cycles and Combinations for sale. We have a fair number at low prices, chiefly left by officers going abroad, to be disposed of. All have been thoroughly overhauled.—Send for particulars, Abergele Motor Co., Kinnel Park Camp Depot, near Rhyl. [X6669]

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1917 ZENITH GRADUA, twin..	70 Gns
1917 B.S.A., 4½ h.p., chain-belt	66 Gns
1917 ARIEL, 3½ h.p., 3-speed ..	£72 0
1917 LEVIS, 2-stroke.....	£32 0
1917 LEVIS, 2-stroke, 2-speed..	£47 10
1917 NEW IMPERIAL-J.A.P. ..	39 Gns
1917 NEW IMPERIAL-J.A.P., kick-starter .....	47 Gns
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1917 ROVER and Sidecar .....	£104 4 6
1917 ROVER T.T., slightly used	57 Gns
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Column Advertisement in this issue  
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## MOTOR CYCLES FOR SALE.

Miscellaneous.

HIGHBURY.—Northampton Garage, Keen's Yard, St. Paul's Rd., Highbury.—4 h.p. Bradbury, sidecar, 3-speed, £35; 2½ h.p. O.K., 2-speed, £25; Auto-Wheel, £7; cycle car chassis, new, 10 h.p. twin w.c. engine, £40; 2½ h.p. Liocota-Elk, £10; quantity of lamps, tubes, and sundries; offers or exchanges. Wanted, Morgans, light cars, etc. [8892]

HEDDEN'S Can Deliver from stock 1917 2½ h.p. and 3 h.p. Enfields; 1917 2½ h.p. 2-speed Imperial-Jap's, ladies' or gents' models; 1917 2½ h.p. Royal Ruby, J.A.P. engine, 2-speed; 1917 latest W.D. type 2 h.p. Imperial-Jap 3-speed combination, 28x3 wheels, all chain drive, price 109 gns.; 1916 4 h.p. Triumph, T.T., in perfect order and condition, £35; 1916 3 h.p. Enfield, 2-speed, as new, complete, lamps, tools, and horn, £45; 1915 3½ h.p. Ariel, splendid order, £20; 3½ h.p. Victoria Precision, in new condition, £25, a gift.—Hedden's Motor Mart, St. James's St., Burnley. Tel.: 488. [0924]

## TRICARS FOR SALE.

6 h.p. Tricar, 2 speeds, free engine, coachbuilt front end, good tyres, wants magento, £10; motor cycle front wheel, girder forks, tyre, tube, £1; 3 h.p. a.v.c. motor cycle engine, £1; good Bosch magento, £2; will exchange for good 3½ h.p. motor cycle.—G. Richards, Hendra, St. Dennis, Cornwall. [X6689]

## SIDECAR ATTACHMENTS.

JAMES Canelet Sidecar for sale; a bargain, £7/15; also speedometer, £2.—41, Brighton Rd., Croydon. [8851]

MONTGOMERY, 1916, suitable 4 h.p., luggage rack, lamp set, apron; £8.—49, Kendrick Rd., Reading. [X6687]

CORONET Sidecars.—Illustrated catalogue free upon request.—Booth's Motories, Portland Place, Halifax.

CORONET Sidecars from £9/15; special model for Harley-Davidson, enamelled French grey.

CORONET Sidecars from £9/15; special model for Indians, enamelled red, 28 in. tyre.

CORONET Sidecars; special coachbuilt model for lightweights, £9/15; illustrated list free.

CORONET Sidecars are made to suit any machine, and delivered from stock.

CORONET Sidecars.—Send for illustrated catalogue from Booth's Motories, Portland Place, Halifax.

SIDECAR Wheels, logs, mudguards, long length tabbing; state requirements.—Booth's Motories, Halifax.

CANOELET Coach Sidecar, right-hand side, cost £12/12, £3/15; enclosed wicker body, with apron 18/6; open cane body, 5/6; 2-seater coach body, £4/10.—Booth's Motories, Halifax. [8597]

THE Willowbrook Co., Leicester, solicit your enquiries for sidecars of all descriptions. Write for illustrated catalogue. [0714]

SHOP-SOILED Farlow Sidecars; usual price £10 sale price £7/17/6 each.—Farrar's Motories, Hopwood Lane, Halifax. [7904]

BASTONE'S for Sidecars and Bodies. Try us before purchasing elsewhere.—228, Pentonville Rd., King's Cross, London, N.1. [9025]

A.J.S. Steel Body Sidecar, strong, roomy, tyre 2½ in. good order, suit heavy machine; £5, offers.—Hull force, Stoke Rd., Slough. [9011]

SIDECARS.—Millford Herald, £6, 11/- month; sale price £7/17/6, 20/2 month.—Juno Works, 248, Bishopsgate, London. [1892]

PHENIX Sidecars, new and second-hand; also several new stock listed to clear; 100 complete sidecars always in stock; list free.—Phenix Sidecars, 736, Holway Rd., London. [X5421]

SIDECARS, touring, sporting, lightweights, at all makes of motor cycles; hoods, screens, and chassis supplied; few shop-soiled models to stock, bargains; export a speciality.—Burbury Sidecar Works, 389-397, Farm St., Birmingham. [7654]

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# THE MOTORCYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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## What Fuel?

**T**HE fuel question has become one of extreme seriousness to motor cyclists. The recent reduction in the price of petrol, although a little step in the right direction, does not help us much, for the change is produced by a lessening of the insurance fees and not by an increased supply of the spirit.

Following hard upon the reduction in price come the new regulations issued by the Petrol Controller and published on another page. The regulations may appear to be somewhat drastic, but, as the Petrol Controller points out in some observations which accompany the Motor Spirit Restriction Order, the continuance of the use of motor vehicles, both cars and cycles, has been far too prevalent.

No sensible motorist denies that the country has just call upon all stocks of fuel, nor grudges that used upon essential services, but no waste should be permitted, and much more discrimination might be used in allotting the surplus. If this surplus is not sufficient, then those whose motor cycles are of vital importance to them, and whose claims have been passed over by the Petrol Control Department, must cast about for another fuel, and, in the absence of benzole, alcohol, and acetylene, coal gas seems to be the only alternative.

This fuel has its limitations, as the report of the demonstration recently held in London clearly shows, but still it is better than nothing, and may enable many a busy man to continue the use of his machine to advantage instead of laying it on one side. Gas is more easily adapted for use on cars than on motor cycles—in the case of two-wheeled solo mounts we fear it must be ruled out of court, at least for the present, but we hope the difficulty of excessive bulk may shortly be overcome.

In the matter of price gas compares very favourably with liquid fuels, being about the equivalent of petrol at 1s. a gallon. On the other hand, until some better means of carrying

it are devised the mileage is extremely limited. About fifty cubic feet can conveniently be carried on a sidecar outfit, and this is roughly equal to one-fifth of a gallon of petrol, or fuel for about fifteen miles. It takes a considerable time to fill the gasbag, but as machines fitted out in this way will probably be used almost entirely on short business trips between regular centres, this is not very serious, for the bag can be fixed to the mains and no harm will result if it be left after it is full, as the gas pressure is not sufficient to overfill it. If gas could be safely compressed into steel cylinders which could be attached to a motor cycle a much more convenient method would be to hand, for full cylinders might be supplied at charging stations all over the country in exchange for empty ones. Even here we meet with a serious disadvantage, for a cylinder to hold 50 cubic feet of gas must weigh at least 35 lb. when made of the best materials and in the best shape. Possibly the solution of the problem will take the form of a sausage-shaped container made something after the model of the outer cover of a pneumatic tyre of rubber and canvas.

This miniature "Zeppelin" would be an intermediate type between the voluminous bag at gas main pressure and the heavy steel cylinder at very high pressure. It would weigh less than a fifth the weight of a steel cylinder, and would not occupy so very much more space. It has reached an advanced experimental stage, and the chief objection to it as compared with the bag is that it cannot be filled from the gas main direct, but needs the intervention of a gas compressor. The position may be summed up in saying that the bag is the thing of to-day and the tyre fabric container the thing of the near future. The tyre fabric container depends for its future on a system being established throughout the country for the distribution and supply of cylinders, much the same as that which existed for the supply and exchange of dissolved acetylene cylinders.



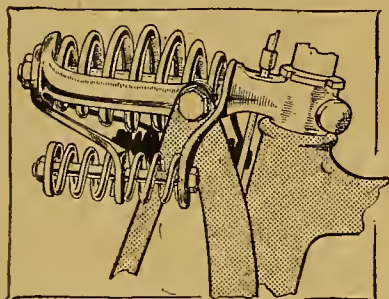
# IDEAS: Useful and Ingenious.

Gray R. Jones

## STRENGTHENING SPRING FORKS.

THE sketch is self-explanatory, but one or two details may be of interest.

We find a little difficulty with the Triumph fork when travelling fairly fast over exceptionally rough surfaces, and the device shown, while not in the least affecting the springing on smooth roads, yet acts as a most efficient buffer or shock absorber under rough conditions. In the sketch, the springs were taken from a Rudge clutch, and an ordinary long bolt and nut is passed right through the springs and brackets, these latter being made out of mild steel one-eighth of an inch thick. The method of attaching the steel brackets to the existing spring fork attachment is clear from the sketch. Another and perhaps simpler way of making the attachment is to use



Auxiliary spring fittings to restrict the motion of Triumph forks.

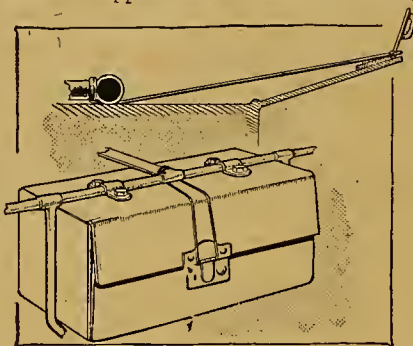
an ordinary Triumph engine valve, with two valve springs and two valve collars, securing the whole with the ordinary valve cotter.—CPL. HADLEY, R.E.

## SIMPLE TOOL BAG SUPPORT.

THE majority of motor cycles are furnished with two tool-bags fitted pannier fashion over the back wheel. They are usually placed on flat metal supports, to which they are secured by rivets or bolts. However tightly these are fixed, the bags, through the natural stretch of the leather, get somewhat "wobbly" on their supports in time, and there is a risk of the leather splitting. I have devised a means of fixing the bags with pieces of brown leather bootlace, and the result is eminently successful. The effect is permanent, and the accessibility of the bags is not affected. As a matter of fact, when the bag is opened the bootlace holds up the upper flap to facilitate tucking away the tool roll and other contents snugly to prevent internal rattles. The bootlace is twisted round the stays of the back carrier, and is then continued across the top of the



bag and down the front to the lock as sketched. The two ends of the bootlace are joined up, and the loop thus formed slipped under the catch of the



An easy way of fixing pannier toolbags which have become loose and insecure through vibration.

lock. The length of the loop must be such that when the flap is in place with the bag closed there is appreciable tension to draw the bag closely and securely against the back support. When the flap is open and up, the tension on the bootlace is relaxed.—J. W. G. BROOKER.

## TO FACILITATE INFLATION.

I SEND you a sketch of a little idea commonly used amongst motor cyclists. An aeroplane type of valve is fitted to back tyres to facilitate attaching inflator.

These valve stems are curved and fit the standard valve, but miss the belt rim nicely.—REG. LOCKE, Sec.-Lt. R.F.C.

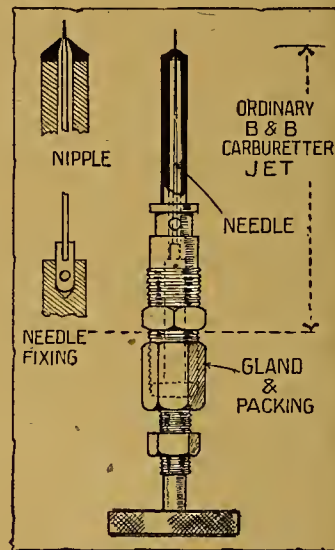
An aeroplane valve fitted to facilitate attaching the inflator.



## AN ADJUSTABLE JET FITMENT.

NO one who has possessed a variable jet carburettor will question the great convenience of the adjustment it permits. By varying the jet to suit the immediate conditions of one's riding, much fuel can be saved, and, quite apart from the question of economy, it enables the rider to regulate his mixture through the last ounce of kick is obtained.

Particularly in these days of substitutes and petrol mixed in haphazard manner is a variable jet a real boon, and here we illustrate a design evolved by one of our readers, and made by him with the crudest of tools. By turning the screw at the bottom of the jet the



Converting a B. and B carburettor into a variable jet type.

position of the tapered needle which regulates the area of the orifice can be regulated, the working of the fitment being clearly illustrated by the sketch.

## A LUBRICATING TIP.

IT is not generally known that castor oil, if added to ordinary engine oil, increases its lubricating properties with the result that much less oil is necessary, while the running of the engine is improved. Being able to obtain castor oil gratis, I have for some time used it, mixed with very cheap engine oil, and have obtained entirely satisfactory results.—K.S.S.

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Rough sketches will suffice.





### Flexible Shaft Drive.

OUR tame inventor is now busy on a gorgeous idea, namely, a flexible shaft drive. You will buy it in lengths like speedometer cable, and couple it up to the crankshaft and rear bevels by screwed unions and cotter pins. There is no particular reason why it should not run inside the frame tubes when a couple of rotund excrescences on the crank case and the hub will be the sole visible symptoms of the fact that the machine has any transmission at all; and the bottom bracket cavities will be strictly reserved for dynamos, Thermos flasks, and other luxuries. I must fall asleep and dream about it. It sounds good, and ought to have the F.N. whacked to the world about A.D. 1945.

### Petrol for Munition Workers.

ONE of the Field Censors added a sneering footnote to a B.E.F. correspondent's letter to us, suggesting that any man who had the time, money, and health to motor ought to be in France. I should like to stand up for the average munition worker. We all realise that there is one topsy-turvy element in the situation. As a trench poet put it, "the maximum of danger means the minimum of pay," and some of us wish that at the outbreak of war the entire nation had been mobilised, and put on rations, and that "pay," or "wages," had ceased for the duration. That may have been impracticable, but neither I nor anybody else will be fool enough to make out a case for the financial inequalities now prevalent. You cannot do it, as between the trenches and the benches; you cannot even do it inside the factories, where a charge hand or foreman, acting as a buffer between the men and the management, carrying a great weight of responsibility and possessed of unusual ability, may only earn his £5 a week, as against the £8 or £9 of the mere machine hands whom he controls. The question of pay or wages apart, I feel a certain sympathy for the munition men, in the teeth of the sneers that are showered upon them so freely by people who should know better; and here goes to state that sympathy.

### A Parallel.

THERE is a certain factory in the trade which had enjoyed the blessings of prosperity and consequent overtime for several years prior to the war, and to which war naturally brought increased prosperity and longer overtime. A working day which commenced at 6 a.m. and ended towards 9 p.m., not infrequently supplemented by night shifts, has been its routine for years past. War broke out. Just as that factory had always shown a high sickness percentage in peace time, so in war time it produced a poor

percentage of general service recruits, or "A" men. In other words, what the munitioner makes in money he loses in *health*. We have all seen pale, pigeon-chested youths with a recurrent winter cough and a morning huskiness go into the Army, and reappear as chesty athletes with the torso of an Apollo and the voice of an auctioneer. The munition hands of all the belligerent countries are making their sacrifice. It is not as picturesque as death on the field of battle, but it is written in its own grim casualty lists, and the civilian doctor is beginning to know something about it. He will know much more about it after another ten years. Money is not everything; the mere prolongation of life is not everything. The infantrymen who come through the hell of Flanders may sometimes envy the shellmaker now; they will not envy him in five years' time.

### And Therefore Petrol.

FOR these reasons I cannot endorse the common sneer about the munition man's piano or sidecar or week-end. If I were Prime Minister, and the resources were available, I would see that every man and girl in the munition factories had a sidecar and plenty of petrol; nothing would do more to cancel the disastrous physical effects of long hours of indoor work at high pressure, amidst fumes or racket, or dust or heat. People denounce the strikes and labour troubles which occasionally complicate the munition problems, few and unimportant as they really are when you look at the thing in the large. Why have sporadic labour troubles occurred? German pay? Natural disloyalty? Temperamental inability, due to want of imagination and education, to visualise great historic developments, as compared with petty personal troubles and frictions? None of those things go for much. Just as you, dear reader, are irritable and touchy and unreasonable to the nissis when you are fagged, so have our overstrained munitioners suffered from ragged nerves and jaundiced judgment from time to time under the intolerable strain of years of overtime at an exhausting job. If we could only endow the white-faced strained munitioner with the deep chest and bronzed health of the fit infantry private, there would not have been a labour stoppage in England since war began. And if I had to choose between two deaths, I'd rather pass with the mere lightning impression of a world-shattering concussion from a "Jack Johnson" in Flanders than cough my soul out slowly in a garret in Birmingham, with the wife and kiddies growing thinner every day. No! There isn't really a lot to choose between the trenches and benches. The trenches offer, physically speaking, a man's life, and, if need be, a man's death. The benches offer a dog's life and a dog's death, if you



## Occasional Comments.—

do your best at them, as you should; and do not lose time, and booze, and sneak out to snatch a furtive smoke. But if there were no benches, there would be no trenches, and *vice versa*. So it is useless to argue and compare. The one fact which needs stating, as Tommy following up the barrage knows, is that the factory hands are doing their bit in this war, and it warms my heart as much to see Jack out in a side-car with a flapper on Sunday as it does to see Tommy sweating down Victoria Street on leave with his pack and tin hat and rifle; though I wish they could fix up for his clobber to be left on the other side, for Jack does not cart his toolkit round with him on Sundays.

## Wanted, a Light Two-speed Gear.

**M**Y original demand for a sound featherweight two-speed gear for sporting roadsters remains unsatisfied, as I knew it would be, seeing that no such gear was in existence when war broke out, and the thoughts of the No. 8 hats have been busy elsewhere ever since. I only revert to the notion because a correspondent reminds me that the baby two-stroke market would sop up thousands of such gears if they were available. At present many of the

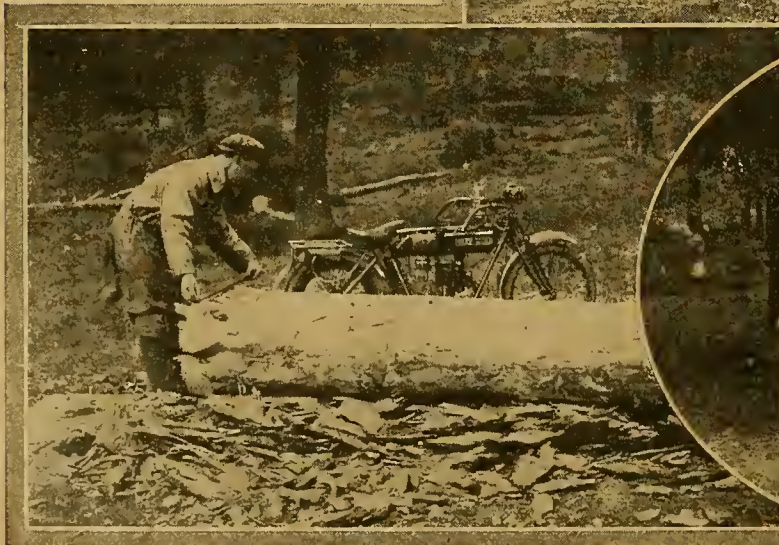
two-stroke merchants fit gears which are not ideal. Maybe, they entail three chains, or a hideous and unnecessary rear chain case, or undue weight and bulk. The even torque of the baby will put up with something resembling a cycle two-speed hub, shoved in a cylindrical housing at the bottom bracket; or, again, something on the lines of the original Douglas two-speed. What with the T.T. roadsters and the babies there should be a good market for a proprietary two-speed gear of this pattern, and I hope it will come along as soon as Haig has finished off Fritz.

## Rotary Engines on Motor Cycles.

**T**HOSE gentry who talk of mounting rotary engine on motor cycles had better devote their attention to the problems of attaining a reasonably low fuel and oil consumption, of reconciling the policy to an unsilenced exhaust, of keeping oil off the rider's person, and solve the dilemma of choosing between a high minimum speed and a maximum speed of forty miles an hour. When they come along with solution of all these puzzles, I shall sit up and take interest. Until then I will remain, as a Yankee correspondent puts it, "plumb batty" about the flat twin, with a few pious hopes in reserve for the four-cylinder.

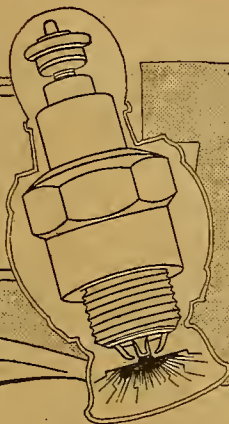
## THE MOTOR CYCLE AN AID TO FORESTRY.

Among the multitudinous uses to which the motor cycle is being put in the various war departments is that of aiding Government officials in inspecting timber. The difficulty of getting about the country from the various and scattered woods can well be imagined, and of all vehicles the motor cycle is the handiest for this purpose. Its superiority to the car in this work is obvious, for winding narrow tracks have to be negotiated and the forests often penetrated to a depth where it would be impossible to drive a car. It will be seen from the photograph that the owner of the Rudge, who is measuring a hewn log, has run his machine right up to the scene of his work.





## EXPERIMENTS WITH SPARKING PLUGS.



SILENT DISCHARGE OR  
FAULTY INSULATION  
AS A POSSIBLE CAUSE  
OF FAILURE.

### Tests showing How the Resistance of the Insulator varies at Different Temperatures.

**A**BOUT a year ago I put forward a suggestion that the failure of some engines when driven hard might be due to what, for lack of a better description, may be called a silent discharge between the plug points.

It will be remembered that this explanation was based on the assumption that the plug points become sufficiently hot to produce ionisation of the gas between them, and so provide a path of low resistance for the current from the magneto.

Several readers were kind enough to criticise the suggestion put forward, and I should like to reply shortly to each of the points raised.

Lt. Crutch, in your issue of September 7th, 1916, stated that the conductivity of gases is not primarily due to heat but to ionisation, which ionisation, whilst always present, is largely increased by the passage of a spark. He then raises the question as to how much of the gas ionised by the spark will remain in the cylinder when the next charge of gas comes to be fired.

Whilst Lt. Crutch is quite correct in his statement concerning the ionisation of gases, he seems to have overlooked the fact that many incandescent metals emit this, so that, provided the plug points reach a high temperature, they may well give out a sufficient number of ions to increase enormously the conductivity of the gas between them. There is no necessity to assume that any ionised gas remains in the cylinder during the working of the engine. The ionisation is caused by the hot points of the plug.

#### The Materials used in Plug Construction.

We then come to "Ixion's" question, raised in your issue of September 14th, 1916, in which he asks how one can explain the fact that a change of plugs will sometimes cure the trouble.

I can offer only two suggestions here. It may be that in some plugs the electrodes keep much cooler than in others, and that in those plugs which are satisfactory the points never reach a temperature sufficiently high to produce ionisation to a serious extent. The other point I would mention is based upon a possible difference between the materials of which the points are constructed. It is well-known that certain substances when heated give off ions much more profusely than others and at a lower temperature. Calcium oxide may be mentioned as a typical example of a substance which gives off a very large number of

ions at a comparatively low temperature. I do not know whether metals differ very much in their ability to produce ions when heated, nor do I know what impurities exist in the metals used for plug construction. It may well be that the insulation itself emits ions when heated, and indeed it would seem much more probable that some such substance as calcium oxide would be present in the insulator than in the metal itself.

However this may be, the fact remains that a number of substances possess the property of emitting a profusion of ions at comparatively low temperatures, and it would seem possible that one or other of these substances may be present in the material used for the construction of certain plugs.

In the same issue as that containing "Ixion's" comments there is also a letter from "A.K." The first part of this is very largely answered by my remarks in reference to Lt. Crutch's letter.

#### The Effect of Heat on the Insulation.

"A.K." then makes the suggestion that the failure of a plug is largely due to the effect of heat on the insulating material.

I was very much struck by this suggestion, and determined to investigate the matter and endeavour to find out exactly what effect an increase in temperature has on the insulation of various plugs.

This I have in part been able to do, and I think that the results obtained may be of some interest. Unfortunately, it has only been possible to devote a very limited amount of time to the investigation, and as I now no longer have the necessary facilities for continuing the work I think it well to describe the results of the experiments up to the present.

I selected a number of plugs, all of which, though not new, were in good condition, and would run quite satisfactorily in an engine under ordinary quiet touring conditions. The engine in which the plugs were tested was a 1916  $3\frac{1}{2}$  h.p. Rover.

The plugs were suitably mounted inside a crucible, which was heated by a Fletcher-Russell gas furnace. A boro-silicate glass thermometer reading up to  $550^{\circ}$  C. was mounted alongside the plugs. The insulation of the plugs was tested by means of a 500 volt Megger. This is an instrument which indicates directly in ohms the resistance of a conductor connected across its terminals.



### Experiments with Sparking Plugs.—

Each plug when mounted in the crucible was tested before heating so as to make sure that there was no accidental short circuit present.

The temperature was then raised slowly to about  $540^{\circ}\text{C}$ ., and the reading of the plug resistance taken at certain temperature intervals as the plug cooled down. The curves obtained by plotting the readings thus taken for nine different plugs are shown in fig. 1.

The temperatures are given in degrees Centigrade and the resistances in megohms (one megohm equals one million ohms).

In all cases the resistance of the plugs before heating was shown by the Megger to be more than twenty megohms, which for all practical purposes may be considered as infinite.

The following are a few notes on the plugs used:

- A.—Three-point type. New 1916; used about 200 miles.
- B.—Three-point type. Condition good; been used; probably new 1915.
- C.—Four-point type. Old; seen much use.
- D.—Six-point type. Condition excellent; been slightly used.
- E.—Single-point type. White porcelain; old plug; been used; good condition.
- F.—Orange porcelain; been used; condition as new.
- G.—Single-point type. Old plug; seen much use.
- H.—Single-point type. Been in use; condition good.
- K.—Three-point type. Seen considerable use; fair condition.

It will be seen from the curves that the orange plug F was by far the best. The behaviour of E is very curious. As a general rule sudden breaks in a curve of this sort indicate errors in reading, but the figures were carefully checked and were found to agree very closely in the second experiment made with this plug.

Now whilst these experiments clearly show that the resistance of the insulating material of the plugs becomes very much reduced as the temperature rises, there is no indication as to whether the diminution in resistance would materially affect the working of the plugs under actual running conditions.

#### A Practical Test.

For the purpose of experiment we may consider the plug insulator as being a conductor connected in parallel with the plug points. The problem is then to determine the value of the resistance such that, when it is connected across the plug points, it will serve to short-circuit the plug.

Under these circumstances the current from the magneto will pass through this short-circuiting resistance instead of across the plug points. In order to

determine the value of their resistance, an adjustable spark gap was constructed and placed in parallel with a plug whilst it was firing the engine. The gap was adjusted until the spark took place across this gap in preference to between the plug points. When this happened the engine, of course, ceased to fire.

The spark gap was then connected in parallel with a plug which could be heated up in the furnace. The plug and spark gap were then connected to the secondary of a large induction coil, which was set in operation. The points of the plug, but not the central electrode, had been previously removed so as to allow the spark from the induction coil to take place at the spark gap instead of at the plug. The plug was then heated up and the temperature measured at which the spark at the gap ceased, owing to the reduction of the resistance of the plug insulation allowing the current

to pass through it in preference to taking the path across the spark gap.

The plug used was A, and the temperature at which the spark across the gap ceased was  $364^{\circ}\text{C}$ .

From this we may conclude that when the resistance of the insulation of a plug falls below that of A at  $364^{\circ}\text{C}$ . a spark will no longer take place between the plug points, the current choosing in preference the path through the insulation.

If now we draw a horizontal line through the point on the A curve where the temperature equals  $364^{\circ}\text{C}$ . this line will intersect some of the other curves, and each point of intersection will give the temperature at which the plug to which the particular curve refers will cease to fire in an engine.

In fig. 2 the curves have been redrawn on a different

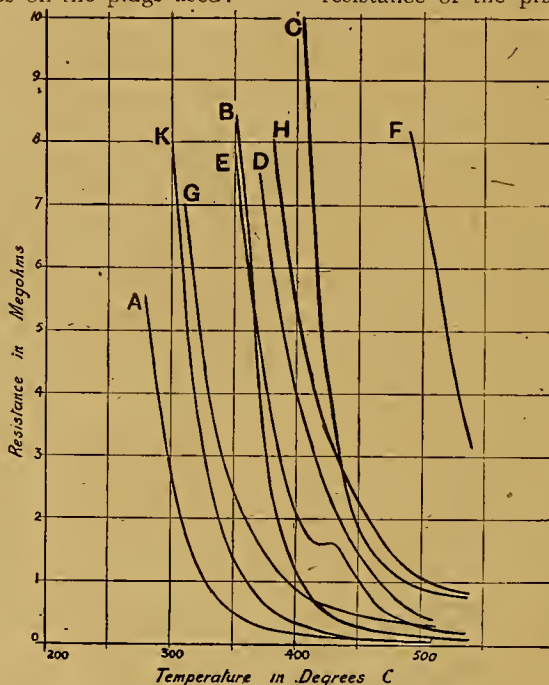
scale, thus making matters clearer. It is evident that at a temperature below  $550^{\circ}\text{C}$ . all the plugs with the exception of C F and H will fail.

A and B are very bad, the one failing at  $364^{\circ}\text{C}$ . and the other at about  $438^{\circ}\text{C}$ .

#### Some Remarks on the Test.

Now, though the experiments were carried out with every care, I should not like to say that the accuracy of determination of the points of failure is very great.

When the value of the spark gap (which, in parallel with the plug firing the engine, would allow the spark to pass across it instead of at the plug points) was determined, the engine was running light and fairly fast. Under these circumstances the value obtained would be more nearly a minimum than a maximum, because not only would the compression pressure be low, owing to a small throttle opening, but the current obtainable from the magneto would be great, due to the fairly high speed.



Graph representing the resistance of the insulation of various plugs at different temperatures.



## Experiments with Sparking Plugs.—

Under actual running conditions, when plug failures most frequently take place, the engine is under heavy load, with the throttle fairly wide open, and, consequently, the compression pressure fairly high. The effect of the high compression is, of course, to make the path between the plug points less easily broken-down than when the compression of the gas is low. The speed of an engine in practice when plug failure takes place may be anything. Probably, as a matter of fact, the speed of the engine when the test was made would more nearly approximate to actual running conditions than would the compression.

The conditions on the whole would indicate that the spark gap determined and made use of later was, if anything, too small.

The effect of this would be to move the true position of the horizontal line, intersecting the curves higher up, thus giving a lower temperature for the failure points.

There are other sources of possible error which I have considered, but they seem to tend all in the same direction as that already mentioned, so that the failure points probably occur at a somewhat lower temperature than shown on the curves.

It will be noticed that the curves round about the failure points are very steep, a small increase of temperature producing a large diminution of the resistance of the insulation. This would doubtless readily account for the fairly sudden failure of plugs under actual running conditions.

The case of plug F is most extraordinary. The orange portion is only a loose cap fitted on, and is merely flashed over with some orange pigment. The main porcelain is colourless, and is carried on asbestos washers, which do not allow it to touch the metal body of the plug anywhere.

I thought this might have something to do with the result, and so I removed the asbestos and screwed the porcelain down on to the metal. Subsequent tests showed the insulation to be every bit as good as before, so that it is evident that the excellent insulation is not in any way due to the use of asbestos.

It is, of course, quite possible that this particular plug may fail in practice owing to faulty electrode design. If the points become incandescent the plug will be of no use. I have personally had no experience with this make, but the porcelain is certainly exceedingly good.

As a result of the experiments which I have described, it is quite evident that the material used for plug insulation is in many cases liable to failure at high temperatures. As to whether this fact actually accounts for plug failure in practice I cannot say, as I have been unable to obtain any figures giving the temperature reached by the insulation of plugs when in use.

I am inclined to think that the inferior porcelain would very probably fail, and that those cases of

failure in which the porcelain is good may often be accounted for by a silent discharge taking place. Another series of experiments was carried out to determine the resistance of a plug insulator, using low voltages instead of the Megger.

The plug, in this case, was connected in series with a battery and a sensitive galvanometer. A number of different voltages were used, but, unfortunately, in many of the experiments the galvanometers had to be shunted, and the values of the shunts were left to be determined later. Owing to pressure of other work this was put off, and now I no longer have the facilities for carrying it out.

However, there are some points worth notice. The first experiment was made with the plug K and a voltage of 8.75. At a temperature of  $450^{\circ}$  C. the resistance of the insulator was 55.8 megohms. The curve obtained with the Megger gives a resistance of .09 megohm as this temperature. With the same plug and a voltage of 30.5 and a temperature of  $450^{\circ}$  C. the resistance was 84.4 megohms.

## An Apparent Contradiction.

In subsequent experiments with the same plug and at the same temperature the resistance was .477 K ohm with 191.1 volts and .207 K ohm with 392.6 volts. The letter K here represents an unknown constant dependent upon the galvanometer having been shunted.

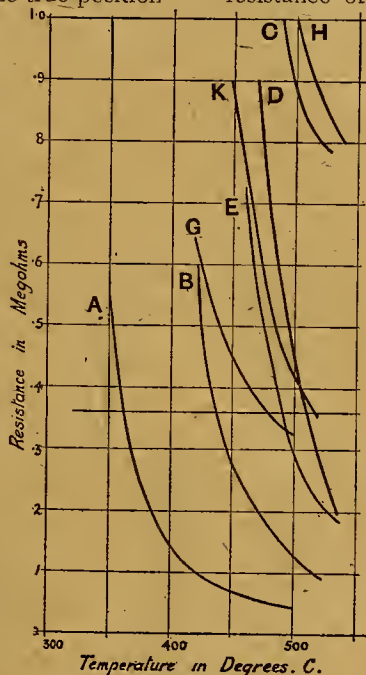
Now these figures appear contradictory. We see that when the voltage used is increased from 8.75 to 30.5 the resistance of the plug goes up, and when the voltage is increased from 191.1 to 392.6 it goes down.

It must be remembered that the resistance calculated in these experiments assumes that the conductivity of the insulation conforms with Ohm's law. As a matter of fact the conductivity is in all probability due to ionisation of a type, perhaps similar to that occurring in gases. On this assumption the figures are readily explicable.

When the applied difference of potential is within certain limits the resulting current through a gas increases less rapidly than the difference of potential. When, however, the difference of potential exceeds a certain value and sets up ionisation the resulting current increases more rapidly than the difference of potential.

In the first case, if one assumed Ohm's law to hold good, the resistance calculated would appear to increase with an increase of potential difference, and in the latter it would seem to decrease. This is precisely what occurs in the case of the plug with which the experiments were made. It should be remembered that in the measurements of resistance made by means of the Megger the assumption was made that the conditions complied with Ohm's law.

The fact that it is practically certain that Ohm's law does not hold, whilst affecting the true values of the resistances, probably does not have any very serious effect on the relative values. C. H. STEPHENSON.



Part of the same graph on a different scale. The horizontal line shows the temperature at which the plug insulation breaks down.





## A NEW REAR ATTACHMENT.

A Design of Rear Car applicable for Private or Trade Usage.

**P**ARTICULARS have reached us of a rear attachment for motor cycles which is intended to replace the sidecar, and, as will be seen from the illustration, is similar to the American invention, the "Cygnets Rear Car," consisting of a car attached to the rear of a motor cycle, having two wheels of its own, so that when in use the motor cycle exercises a towing effect, much the same as in the case of the old trailer. The main difference between the backcar and the trailer is that the backcar wheels are only a short distance behind the motor cycle, and the passengers are close up to the driver of the motor cycle.

The construction of the arrangement is made fairly clear from the illustration. It will be seen that the frame of the backcar is attached to the motor cycle near the saddle tube, so that the driving effect is entirely of a towing nature.

The backcar may be so fixed as to allow of the carrying of two extra passengers, in which case the driver of the motor cycle occupies the normal position on the saddle, or the saddle of the motor cycle may be removed, and by special attachment a steering tiller provided, so that the driver may sit in the backcar and have one passenger at his side. In this case, of course, the controls of the motor cycle would have to be rearranged so that they could be brought within easy reach of the driver, but this is a matter presenting no insuperable difficulties.

### As a Commercial Attachment.

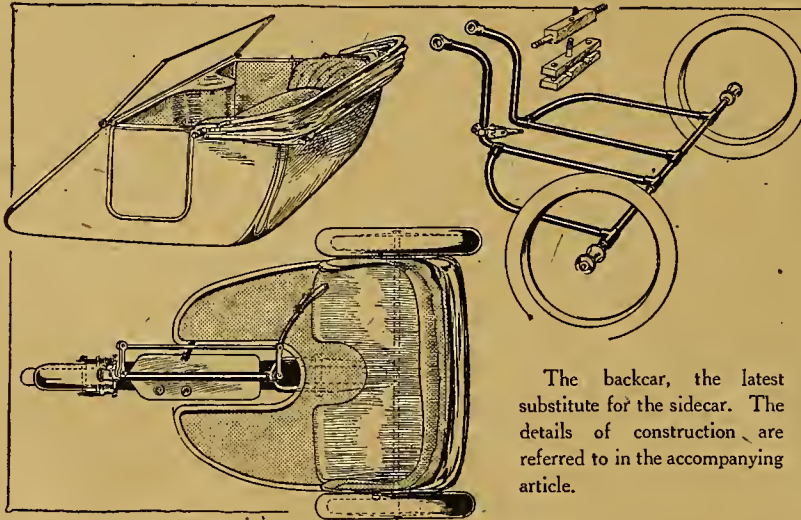
The backcar body may also be constructed in the form of a box, suitable for carrying bakers' or butchers' goods, or the inventor suggests that it may be used in the form of a lidless box so as to be suitable for a milkman or market gardener.

The carrying capacity of such an attachment as this should considerably exceed that of the ordinary sidecar tradesman's carrier, and it is possible that the goods carried would be subjected to less vibration than they would in the more conventional sidecar. These are points that are likely to appeal to all.

The advantages claimed are that the pull of the engine and of the brakes is always central; that the load, owing to its being carried on four wheels instead of three—as in the case of the sidecar—may be much increased, and the balance of the combination will in no way be upset. Naturally, the backcar wheels could be fitted with light car type brakes, and it is also claimed that attachment and detachment are simpler than in the case of the ordinary sidecar, as owing to the better balance fewer points of attachment are necessary.

### Steering.

A slight turning movement is allowed to the rear portion of the motor cycle, so that in turning hair-pin corners the motor cycle rear wheel may turn independently of the backcar, but the inventor thinks that this movement, though advisable, is not absolutely necessary, as the backcar wheels will "differential" in any direction. Moreover, the patent covers either a rigid or flexible attachment, so that whichever experience proves to be the more desirable may be finally



The backcar, the latest substitute for the sidecar. The details of construction are referred to in the accompanying article.

adopted. There are two different lengths of chassis for the backcar, according to the position in which it is to be used. If it is intended for the motor cycle driver to sit in the backcar a short chassis is used, and this brings the backcar wheels only slightly in rear of the motor cycle wheel. If, however, the motor cycle is to retain its saddle so that the driver may sit in the usual position, the backcar is provided with a longer chassis, so that its wheels are somewhat further behind the motor cycle wheel, i.e., when intended to carry either a tradesman's box or two passengers besides the driver the long type chassis will be the most desirable form.

As regards the cost and other aspects of manufacture, the inventor considers that it should cost little more than the ordinary sidecar, and he is anxious to get in touch with some manufacturer who would consider the question of taking up the manufacture of the backcar on a large scale.





*Ariels for the War.*

# THE BATCH OF ARIEL MOTOR CYCLES

ILLUSTRATED

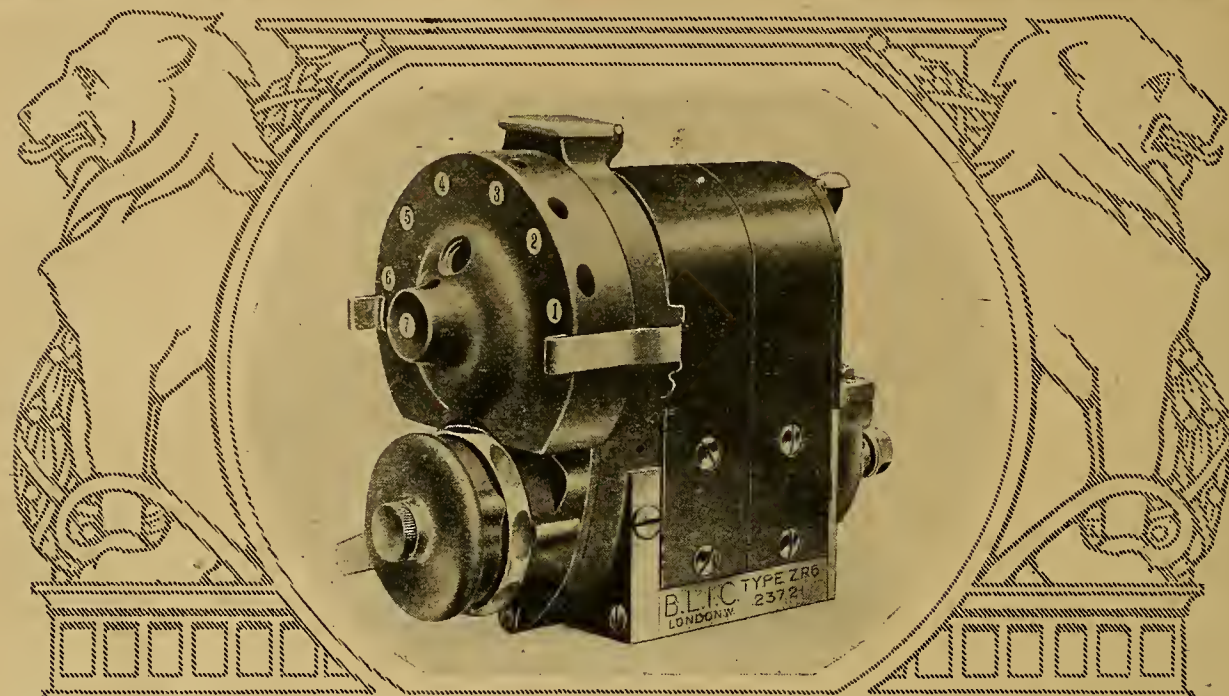
COMPRISE PART OF A  
BIG CONSIGNMENT  
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ARIEL WORKS, LTD.,  
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*In answering this advertisement it is desirable to mention "The Motor Cycle."*





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Built in a British Factory by British workmen, with a unique experience of magneto manufacture, the "B.L.I.C." embodies every scientific principle in design and manufacture. It is the most reliable magneto yet produced—British or foreign.

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# FUEL REGULATIONS CLEARLY DEFINED.

New Restrictions made by the Board of Trade.

THE following restrictions are made by the Board of Trade under Regulations 2F and 2JJ of the Defence of the Realm Regulations.

Whereas it appears expedient to the Board of Trade to make further exercise of their powers under the defence of the Realm Regulations for the purpose of maintaining the supply of petrol and other liquid substances capable of driving internal combustion engines.

Now therefore, the Board of Trade, in exercise of their said powers, do hereby order as follows:

1. In this Order, the expression "petrol or petrol substitute" means any inflammable liquid substance capable of being used for the purpose of driving internal combustion engines, whether such substance has been, or is liable to be, taxed or not.

The expression "motor vehicle" means any vehicle or cycle propelled by means of an internal combustion engine, or by means of a steam engine, of which the fuel is either wholly or partly petrol or petrol substitute.

The expression "performance of a public duty" includes attendance at or upon any Court of Justice, or at or upon any body or person exercising public duties, when such attendance is in connection with the business of such Court of Justice or such public duties, and the performance of a duty undertaken for or in connection with the service of a Government Department or such body or person as aforesaid when such duty is duly authorised by such Department, body or person, and the performance of a duty undertaken at the direction of a Court of Justice.

2. On and after the first day of November, 1917, no person shall use, or cause or permit to be used, any petrol or petrol substitutes for the purpose of driving any motor vehicle or motor boat or for any other purpose except as is hereinafter expressly authorised.

3. Petrol or petrol substitute may be used, provided it is obtained in accordance with the provisions of a motor spirit licence issued by the Petrol Control Department of the Board of Trade for the following purposes:

(a) For driving a motor vehicle in respect of which motor car duty is payable under Section 86 of the Finance (1909-10) Act, 1910, where such vehicle is used:

(1) in the conveyance of a person or goods to or from the nearest convenient railway station in connection with a railway journey, and where no other means of conveyance is reasonably available;

(2) for the purpose of the profession, trade, or business carried on by, or the necessary household affairs of, the person on whose behalf the motor vehicle is being used where the journey cannot otherwise be reasonably and conveniently accomplished, provided that the conveyance of a person for the whole or part of the distance between his

residence and place of business shall not be deemed to be a journey undertaken for the purpose of his profession, trade, or business if railway or other means of communication be reasonably available;

(3) in the performance of any public duty for the whole or part of a journey which cannot otherwise be reasonably and conveniently accomplished either in whole or in part;

(4) on any sudden or urgent necessity, where life or limb is or may be endangered;

(5) in the performance of ambulance work or for the purpose of attendance upon a sick or injured person where such attendance cannot otherwise be reasonably provided;

(6) for funerals;

(7) in the conveyance of a duly qualified medical practitioner or veterinary surgeon while it is being used by him for the purposes of his profession;

(8) for the purposes of the Red Cross Society, Saint John Ambulance Association, or any similar Red Cross society approved by the Admiralty or Army Council or by the Allied Governments.

(b) for driving a motor vehicle which is constructed or adapted for use, and is used, solely for the conveyance of any goods or burden in the course of trade or husbandry, and whereon the Christian name and surname, and place of abode or place of business of the person, or the name or style and principal or only place of business of the company or firm keeping the same, shall be legibly and visibly painted in letters of not less than one inch in length;

(c) for driving any motor vehicle licensed to ply for hire, provided that nothing herein contained shall be deemed to affect the restriction placed upon the use of motor spirit by char-a-bancs and other like vehicles under Regulation 8G of the Defence of the Realm Regulations;

(d) for driving any other motor vehicle being a hackney carriage within the meaning of Section 4 of the Customs and Inland Revenue Act, 1888, for any purpose for which it has

been specially authorised to be driven by the Board of Trade during such time as such authority is in force;

(e) for driving a motor vehicle which is a motor fire engine or other vehicle being used for fire brigade purposes, or a motor ambulance;

(f) where a special authority in writing has been granted by the Petrol Control Department of the Board of Trade.

(4.) Petrol or petrol substitute may be used for the purpose of driving a motor fishing boat or other motor boat used for the purpose of the profession, trade, or business (other than the trade or business of letting motor boats for hire or for conveying passengers on pleasure trips) carried on by the person on whose behalf the motor boat is being used; or for driving a motor tractor or motor plough used for the cultivation of land or other agricultural purposes; or for driving a motor sweeping or watering machine or other vehicle used for sanitary purposes; or for purposes other than the provision of motive power to motor vehicles; provided that petrol or petrol substitute, if subject to duty as motor spirit under Section 84 of the Finance (1909-10) Act, 1910, must be obtained in accordance with the provisions of a motor spirit licence issued by the Petrol Control Department of the Board of Trade.

(5.) The proof of the purpose for which the motor vehicle is used shall in all cases lie upon the person using or causing the use of the petrol or petrol substitute.

(6.) Nothing in this Order applies to the use of petrol or petrol substitute for the purpose of driving motor vehicles in the exclusive use of a Government Department; or motor vehicles enrolled for war service under a scheme authorised by the Army Council or Secretary of State for War, which are provided for the purpose of such service with petrol or petrol substitute from Army sources under due authority, and while they are actually employed on the service for which they are so enrolled. A certificate issued under the authority of the Army Council or Secretary of State for War shall be evidence that the motor vehicle is enrolled under such a scheme authorised by them.

(7.) Infringements of this Order are summary offences against the Defence of the Realm Regulations.

(8.) This Order may be cited as The Motor Spirit Restriction Order No. 2, 1917.

W. F. MARWOOD,  
A Secretary to the Board of Trade.  
October 11th, 1917.

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(e) for driving a motor vehicle which is a motor fire engine or other vehicle being used for fire brigade purposes, or a motor ambulance;

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W. F. MARWOOD,  
A Secretary to the Board of Trade.  
October 11th, 1917.

**A Note on Clause 6.**  
The Petrol Controller desires to call attention to the provisions of Clause 6 of the Order, under which motor vehicles enrolled for war service are exempt from the restrictions imposed by the Order only while they are actually employed on such service. At all other times these vehicles are subject to the restrictions of the Order as in the case of any other vehicle.



# MOTOR CYCLES AND COAL GAS.

Three Methods by which Flexible Containers may be used in connection with Two or Three-wheelers.

ON Wednesday last week an exceedingly interesting exhibition of coal gas-driven vehicles, including three motor bicycles, was held at the commercial repair depot and garage of Messrs. John I. Thornycroft and Co., Ltd., in Pulford Street, Grosvenor Road, London, S.W.1. Organised by our contemporaries, *The Commercial Motor* and *The Motor*, the gathering proved attractive to a large crowd of motorists, and throughout the afternoon eager enquirers thronged half a dozen deep round every one of the thirty or so exhibits on view.

So far as readers of *The Motor Cycle* are concerned, the vehicles worthy of special mention consisted of a  $2\frac{3}{4}$  h.p. Douglas solo machine, alongside of which, on telescopic supports, was carried a long sausage-shaped gasbag, 7ft. 8in. in length, and with a circumference measuring approximately 6ft.; an 8 h.p. Zenith and sidecar, with a 50 cu. ft. container on a canopy above the sidecar; and a Scott motor cycle combination, in connection with which the gas was carried in a flexible bag stowed on one of the Cox gas trailers manufactured by Mr. Douglas S. Cox, 6, Lansdowne Hill, West Norwood, S.E.

It must be confessed that, so far as the arrangement of the gasbag alongside the Douglas was concerned, this did not give the impression of being entirely practical, for the long container was insufficiently supported between the fore and aft carrying arms, and when we saw the machine ridden out of the garage it was obvious that when a corner to the right—the gasbag being on the right-hand side of the bicycle—

had to be negotiated the fabric of the container came perilously near the ground, and even occasionally touched it.

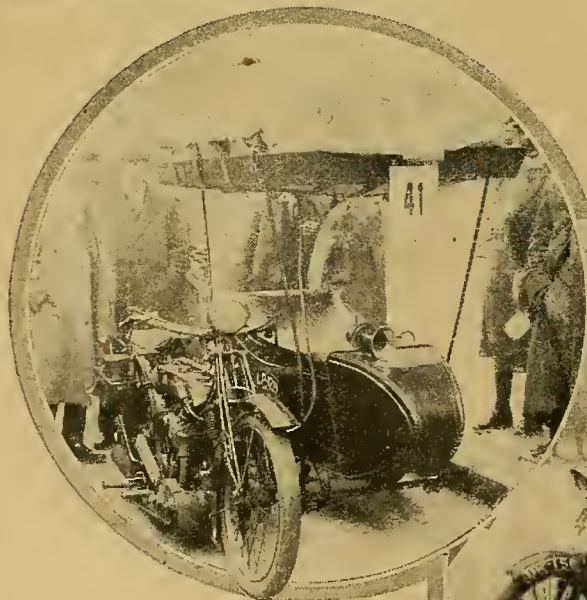
Also, one could not help wondering what would occur were a strong side wind to strike the container from the right. The steering could scarcely fail to be upset, and the bag, with its present supports, would tend to blow in against the rider's leg, and, possibly, even against the hot cylinder walls.

However, this exhibit, which was lent for exhibition by Messrs. Barton Bros., of Beeston, Notts., and was fitted with one of the well-known Barton gas containers, provided conclusive evidence that efforts are being made to solve the problem of gas fuel on solo machines, and we wish every success to Messrs. Barton Bros. in their endeavours in this direction. One cannot hope reasonably to overcome all difficulties at a first attempt, and it is something to know that a firm of this distinction is interesting itself in the problem of applying gas propulsion to the two-wheeler.

## A Sidecar Canopy Container.

The 8 h.p. Zenith combination, with its gasbag on a canopy above the sidecar, seemed to us a more promising proposition, though, of course, the amount of space available is strictly limited. We made enquiries from the owner of the machine, who is a member of the staff of our contemporary *Motor Cycling*, and he informed us that the capacity of the container, also made by Messrs. Barton Bros., is between 40 and 50 cubic feet, the distance that can be covered on one charge being about ten miles.

The gas, both in the case of this machine and of that of the Douglas, is admitted through an ordinary open-ended pipe into the mixing chamber of the carburetter, where the necessary amount of air is added before the mixture is drawn up into the cylinders. No complicated spraying device is, of course, required.



(Top) 8 h.p. Zenith and sidecar, fitted with gasbag on canopy.

(Bottom) A Scott combination with a Cox gas trailer in tow.

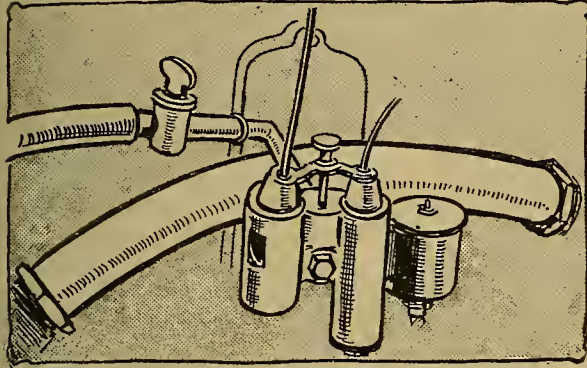




**Motor Cycles and Coal Gas.—**

since the fuel is fed in the form of a ready-made gas, and all that is necessary is to add to it a certain proportion of air.

The third exhibit, as we have mentioned, was a Scott motor cycle and sidecar with a Cox gas trailer behind it, and here, naturally enough, the amount of



A simple arrangement by which gas is admitted to the mixing chamber of the  $2\frac{1}{2}$  h.p. Douglas carburetter. It consists of a rubber pipe, a tap, and a right angle metal connection screwed into the carburetter.

gas that could be carried was very much in excess of that possible in the case of either of the other two machines. The container, once more by Messrs. Barton Bros., had a capacity of 120 cubic feet, and we were informed that the outfit on a single charge

of fuel could be run approximately thirty miles. It was stated that the container could be filled from an ordinary household meter in forty minutes, and that from a zin. supply pipe the necessary amount of fuel could be procured in eight minutes. A point was made of the fact that the riding and steering of the machine were not in any way affected by the attachment of the trailer.

The two principal drawbacks to the trailer form of gas storage are, we need scarcely point out, the somewhat clumsy appearance, which is a small matter in times like the present, and the very considerable head resistance that must inevitably result if the machine is travelling against a strong wind. This last-mentioned criticism, however, would apply equally—or even more—to a gas bag carried upon a canopy, for in the case of a trailer the bag would be travelling in the forward-moving air eddies formed behind the motor cycle and sidecar.

The dense crowds which surrounded the three motor cycle exhibits testified undoubtedly to the keen interest that is evinced in the possibilities of gas fuel by motor cyclists. We heartily congratulate our contemporaries on the success of this—the first—demonstration of gas-driven vehicles, and we hope that when the next exhibition of this nature comes about it will have been found possible to adapt compressed gas cylinders to motor cycles, since it is obvious that the flexible container is but a makeshift, and that the future, at any rate so far as two and three-wheelers are concerned, must lie with gas carried in a small space and under high compression.

## THE 1918 HARLEY-DAVIDSON.

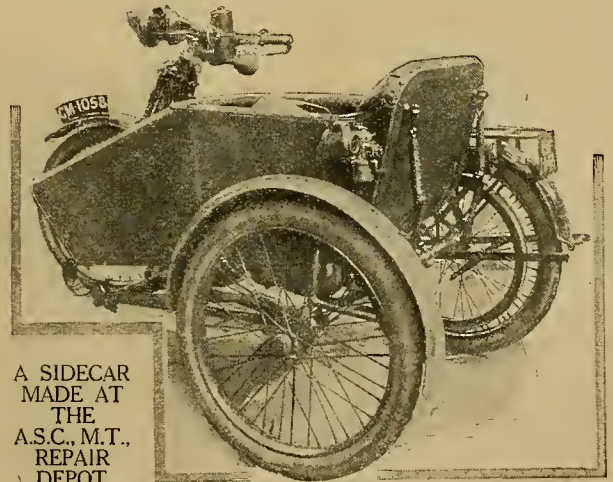
THE American motor cycle journals at the present time are busy with descriptions of Harley-Davidson motor cycles for next year, so far as they concern the model destined for use in America. The alterations to this machine are only of minor character, but they would appear to be in the nature of those little refinements which, taken together, go a long way.

One of the main alterations, for instance, is in the clutch bearing. Previously this was of the ball type, but now the bearing is of the large double roller type of Harley-Davidson design and manufacture. Also special provision has been made so that the lubrication of the clutch may be effected with a minimum of trouble. It is not necessary to remove the chain guard, or anything else, in order to oil the clutch, which can now be lubricated through an ordinary oil cup in the chain guard. Another lubricating improvement is concerned with the inlet valve rocker arm bearing. A small oil well has been fitted in the rocker arm stud, so that there is a small reservoir of oil which serves to keep this important bearing always well lubricated.

It is claimed that various minor alterations and adjustments in the carburetter have resulted in a vast improvement in the petrol consumption, while such points of equipment as chain guard, saddle, and horn have also been improved.

Various improvements have been effected in the sidecar, mainly with the idea of providing a more com-

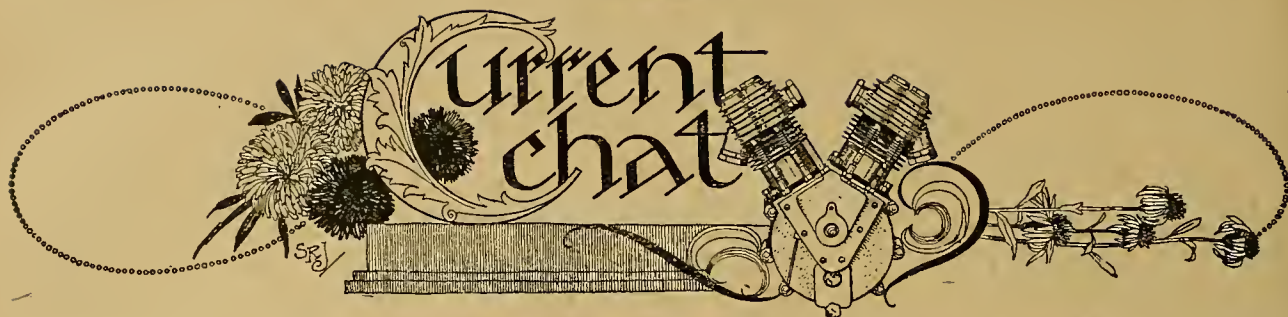
fortable riding position and better springing in the car itself. Thus the body is mounted further back, so as to effect a better distribution of weight on the sidecar springs, and coil springs are employed in the upholstered back and seat inside the sidecar—a very considerable improvement.



A SIDECAR  
MADE AT  
THE  
A.S.C., M.T.,  
REPAIR  
DEPOT.

A sidecar fitted to a 4 h.p. Triumph, the chassis of which formerly served to carry a Vickers light gun. Note the system of springing which has been incorporated. The work was carried out by the A.S.C., M.T., repair depot, of which we wrote a description in the issue of August 23rd.





## TIMES TO LIGHT LAMPS.

## GREENWICH TIME.

Oct. 18th	...	...	5.31 p.m.
" 20th	...	...	5.27 "
" 22nd	...	...	5.23 "
" 24th	...	...	5.18 "

## Barrister to Investigate.

Mr. Fredeirck Thoresby has been appointed Investigation Officer to the Petroleum Executive. He is a barrister-at-law of the Inner Temple, and was until recently managing director of the Car and General Insurance Corporation.

## Coal Gas for Motors.

The manager of the Gas Light and Coke Co. is said to have told the press that the reason why gas has, in some instances, been refused to motorists was that no facilities existed for coping with this demand. The company is considering plans for increasing the number of depots at which motor vehicles can be charged.

## The Evolution of the U.S. Aero Engine.

On the entry of America into the war, two of the best engineers in the States were, figuratively speaking, seized and locked up in a room together. They had never met before. Here they were ordered to evolve an aeroplane motor for use as a standard type in the American Army. The suite of rooms engaged for them was not left by either man for five days. Engineers and draughtsmen from all parts of the country were brought to Washington to assist. Work proceeded day and night, the engineers working in alternative shifts.

It is stated that the American manufacturers and engineers gave up their trade secrets, and all were melted down in the smelting pot of urgent war need.

The result of all this was that a remarkable engine was produced three weeks before any model could have been brought from Europe, and twenty-eight days after the drawings were started the new engine was set up. It was sent to the nation's capital by special express in order to have it running there by Independence Day. Some hustle!

## Under Test.

The parts of this first engine were made in various factories scattered between Connecticut and California. When assembled the parts were perfect, and the performance of the engine was surprisingly gratifying. Be it understood that no untried theories were adopted. The new engine was successful because it embodied only the best features of modern and proved practice, and celebrated consulting engineers in England,

France, and Italy co-operated in its development. An altitude test was carried out at Pike's Peak, and later one engine in a aeroplane broke the American high-flying record.

## Petrol Prices.

On October 11th petrol prices went down. Instead of 4s. per gallon, the local garage now asks 3s. 10d. For which small mercy many thanks to the powers that be. Those with inside knowledge of wholesale prices have asked themselves for some time what constitutes a legitimate profit for the retailer of petrol. A licensed dealer may obtain from the supply company No. 1 spirit at 3s. 3d. per gallon; No. 2 spirit at 3s. 2d. per gallon; and No. 3 spirit at 3s. 1d. per gallon. Nos. 2 and 3 are the spirits at present sold for ordinary motor work. The price 3s. 10d. mentioned above is for No. 3. By reselling at 3s. 10d., the retailer makes 9d. per gallon, and this figure of 3s. 10d. is by no means the limit asked for No. 3 petrol. Is 9d. per gallon a legitimate profit in the opinion of motorists? It must not be forgotten that most retailers have contracts running with the dealers, and may easily be netting another 8d. or 9d. per gallon on all spirit supplied under contract. As a matter of fact, those dealers who have had yearly contracts ahead since the commencement of the war have had a very good time indeed with selling prices continually on the rise. Perhaps Nemesis awaits them later. *Quien sabe?*

## SPECIAL FEATURES.

## SPARKING PLUG TESTS.

## MOTOR CYCLES AND COAL GAS.

## THE NEW PETROL ORDER.

## New Motor Checking Methods

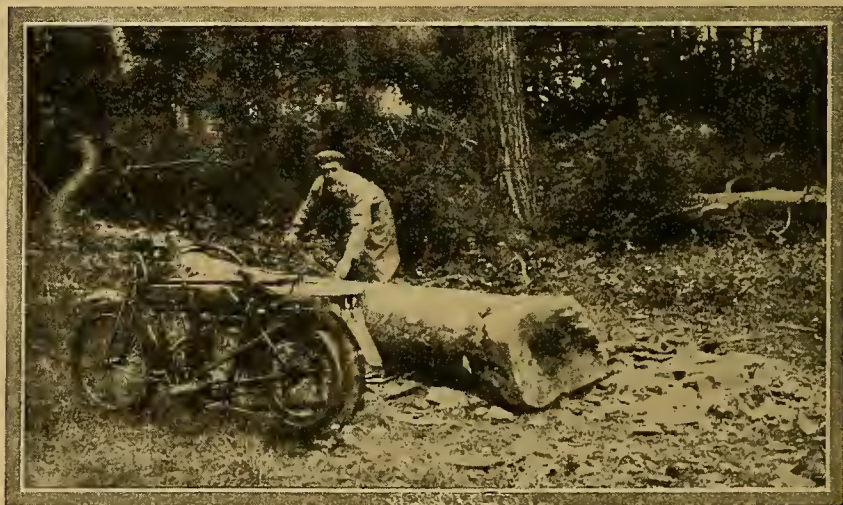
It is stated that a man in plain clothes, with a sheet pinned on a wooden board, and a kind of roadside shelter box, was seen jotting down the number of every car and motor cycle at Farnborough, on the Sevenoaks Road, at the week-end. The object did not appear clear. No one appears to have been stopped or questioned by the individual.

## U.S.A. Army Demands.

A U.S.A. contemporary, *Motor Cycling and Bicycling*, gives the following figures: "With the 22,000 aeroplanes in use, there will be required approximately 43,000 lorries, 13,000 passenger cars, and 47,000 motor cycles. Each squadron of the aeroplane division requires thirty-four lorries, seven passenger cars, and thirty-five motor cycles. For each aeroplane there will probably be a spare engine, so that the total number of engines used in this division of the army will be close upon 125,000.

## A Correction.

The block at the bottom of page 352 in last week's issue represents an Indian clutch undergoing test—not a Sturmey-Archer as stated in the inscription.



A Government official who makes good use of his Rudge motor cycle in his work of inspecting timber. (See page 370.)



**The National War Relief Funds.**

At the week-end the principal war relief funds stood as follow:

The National Relief Fund (distributed \$3,657,622) ..	£6,274,471	0	0
British Red Cross Fund ..	7,343,471	18	1
Tobacco Fund ..	136,435	0	0

**A Motor Cyclist's Exemption.**

A south-country motor cyclist, aged 35, category C2, and with a one-man business, was granted renewed exemption at the local tribunal—so rumour asserts—conditional to his placing his Ariel sidecar outfit at the disposal of the local special coastabulary.

**Motor Cyclist and R.F.C. Engine Inspector.**

We hear that the Brookdale and Rudge competition rider, W. F. Guiver, who has been in the R.F.C. at Farnborough for over twelve months, is now an inspector of R.F.C. engines, and his duties take him to France as well as all parts of this country. Guiver's pre-war motoring was solely confined to motor cycles—Rudge and Ariels in particular—and he specialised in carburettor tuning. He was proprietor of the Haven Motor Cycle Depot, Old Kent Road, S.E.

**Photographic Exhibition.**

The Royal Photographic Society, of 35, Russell Square, W.C., is this year holding its annual exhibition at its own premises as above, instead of at one of the art galleries, and invites the public to view the photographs free of charge. The exhibition is now open daily (Sundays excepted), from 11 a.m. till 9 p.m., and lantern lectures on popular and interesting topics are being delivered each Tuesday and Friday evening from eight till nine. An interesting feature is a large series of photographs loaned by the Royal Flying Corps. These show positions held by the enemy, and, as the

photographs made by flight officers have been taken at intervals, show the obliterations of the natural features of the country under heavy gun fire. Another series shows our own men drawn up for attack. In one instance the troops are seen standing at ease and later on at attention before the General in Command. Large detachments of aeroplanes guarded the troops from the enemy's flying machines. Another series show the gradual evolution of the trench system, from the simple earthworks thrown up in the early days to the elaborate system now in vogue on the Western front.

**A Test to Destruction.**

Recently six 8 h.p. military model New Imperial motor cycles underwent a gruelling which may almost be described as a test to destruction. The machines were driven by two English officers, two Russian officers, and two New Imperial testers—the course consisting of deep mud, slush, brooks, ditches, bypaths, boulders, etc.—and all emerged with flying colours.

**Curious Expectations.**

In a recent provincial newspaper the following advertisement appears: "Wanted, 2½ h.p. twin Triumph motor cycle." We would suggest that the advertiser communicate with the Triumph Co., who, as far as we are aware, are the only people at all likely to be able to satisfy the want.

**And Another.**

Which reminds us of a letter we recently received from a correspondent who bought a machine advertised as a 3½ h.p. —, but on finding it was a 2½ h.p. twin and not a 3½ h.p. single, wrote to us an indignant letter of complaint. The curious part of the whole

business was that this worthy did not discover that his purchase was a twin till, sending the engine number to the makers, they informed him of this seemingly minor detail.

**North Country Motor Cyclist Honoured.**

Lieut.-Surgeon W. J. McCracken, R.N., of Blyth, Northumberland, who holds the Military Cross, has also been awarded the D.S.O. for conspicuous gallantry and resource. After attending the wounded in captured dug-outs, he pushed forward into a village which was being heavily shelled and continued his work. He also searched the front line under a heavy fire for wounded.

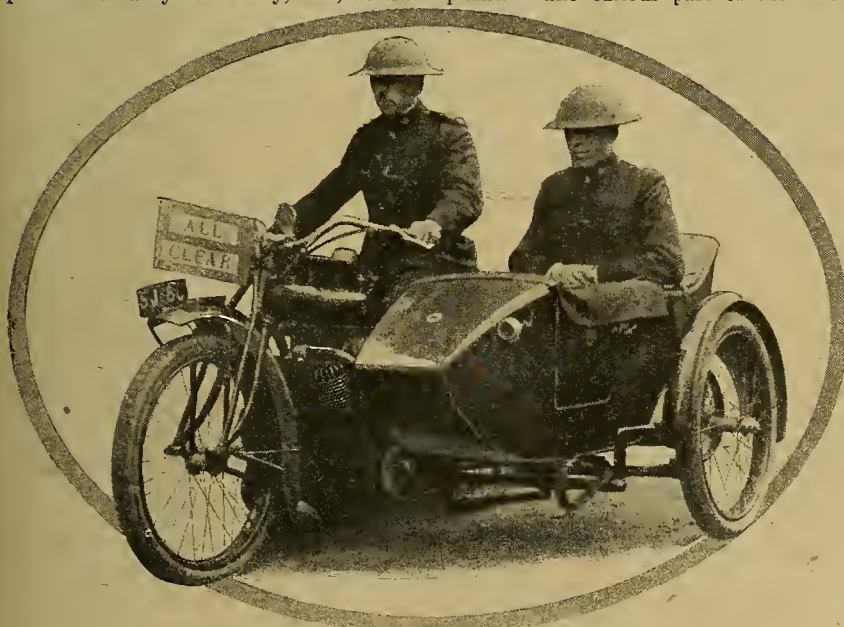


Lt. - Surgeon W. J. McCracken, R.N.

**Average Prices.**

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available.

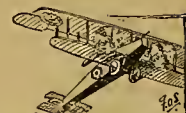
Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3½ 3-speed .....	£45	£40
Abingdon ..	1914	5-6 3-sp. sidecar..	—	£54
A.J.S. ....	1916	6 combination ..	—	£96
" .....	1914	6 combination ..	£68	£68
" .....	1916	4 combination ..	—	£75
Allon .....	1916	2½ 2-speed .....	£30	£31
" .....	1914	2½ 2-speed .....	—	£27
Ariel .....	1915	3½ 3-speed .....	£72	£73
" .....	1914	5-6 combination..	—	£53
Bat .....	1914	6 3-speed .....	£45	£46
Pradbury ..	1914	4 2-sp. sidecar ..	—	£40
Brough .....	1916	3½ 2-speed .....	—	£53
B.S.A. ....	1916	4½ sidecar .....	£65	£60
" .....	1915	4½ sidecar .....	£54	£57
Calthorpe ..	1916	2½ 2-speed .....	—	£30
" .....	1915	2½ 2-speed .....	—	£25
" .....	1916	2½ 2-speed .....	£26	£29
Clyno .....	1915	2½ 2-stroke .....	—	£25
" .....	1914	6 combination ..	—	£63
Connaught ..	1915	2½ 2-stroke .....	—	£24
Douglas .....	1916	2½ 2-speed .....	£48	£46
" .....	1915	2½ 2-speed .....	£44	£43
" .....	1914	2½ 2-speed .....	£37	£39
Enfield .....	1916	6 combination ..	£83	£85
" .....	1915	6 combination ..	£75	£73
" .....	1916	3 2-speed .....	£42	£44
Excelsior ..	1915	8 2-speed .....	—	£40
H.-Davidson	1916	7 combination ..	£85	£82
" .....	1915	7 combination ..	£74	£70
Henderson ..	1916	7 combination ..	—	£100
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	5 combination ..	£42	£68
" .....	1916	7-9 combination..	£71	£80
James .....	1916	4½ combination ..	£65	£65
" .....	1916	2-speed 2-stroke ..	—	£53
Lea-Francis.	1916	3½ 3-sp. sidecar ..	—	£63
" .....	1915	3½ 3-sp. sidecar ..	—	£58
Levis .....	1916	2½ Popular .....	£26	£23
" .....	1915	2½ Popular .....	£24	£21
Matchless ..	1915	7 combination ..	—	£81
New Hudson	1916	2-speed 2-stroke ..	£27	£28
" .....	1916	4 combination ..	—	£60
New Imperial	1916	2½ 2-speed .....	£38	£34
" .....	1915	2½ 2-speed .....	£28	£27
Norton .....	1916	3½ 2-speed .....	—	£53
" .....	1915	3½ T.T. ....	—	£43
P. & M. ....	1915	3½ combination ..	—	£69
" .....	1914	3½ combination ..	—	£51
Premier .....	1915	2½ 3-speed .....	—	£47
Royal Ruby	1916	2½ 2-stroke .....	—	£22
Rudge .....	1916	3½ Multi .....	—	£44
" .....	1915	3½ Multi .....	—	£42
Scott .....	1916	3½ combination ..	—	£65
Sun .....	1915	2½ 2-speed .....	—	£22
Sunbeam .....	1916	8 combination ..	£110	£110
" .....	1916	3½ solo .....	£76	£75
" .....	1915	3½ combination ..	—	£76
Triumph .....	1916	2-speed 2-stroke ..	—	£37
" .....	1915	4 countershaft ..	£58	£57
" .....	1915	2-speed 2-stroke ..	—	£28
Velocette ..	1915	2½ 2-sp. 2-stroke ..	—	£26
Zenith .....	1915	8 Gradua .....	—	£60



THE LATEST ROLE FOR THE SIDECAR.

Members of the H.Q.C.D. police are preparing for possible air raids, and protect themselves from falling pieces of shell by donning steel helmets. The photograph shows Inspector Bridgman (better known as Frasetti), on an Indian outfit, exhibiting the safety notice after an air raid.





# FLYING FACTS AND THEORIES

## MONO-, BI-, OR TRI-PLANE.

## Some Reasons for the Popularity of the Biplane.

THE question must frequently be asked, why is the biplane the prevailing type of aeroplane, when it has been clearly demonstrated that successful monoplanes and triplanes are perfectly feasible and, in point of fact, exist side by side with it to-day? The answer to this question cannot be given in a direct manner, as it involves looking at the various types from several distinct points of view. For instance, the engineering aspect has to be considered in connection with the structure of the machine; the

components in tension—the latter in most aeroplanes take the form of wires, and the stress to which they are submitted is proportional to the tangent of the angle at which they are set.

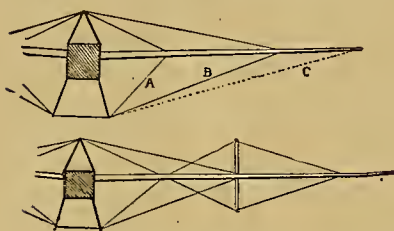
Fig. 1 is a diagrammatic representation of a simple monoplane, in which the spars of the wings are supported, in flight, by the wires A and B. Of these, A is at a much



Figs. 3 and 4.

better angle than B, which relatively is far more highly stressed, and requires, therefore, to be proportionately stouter and stronger. The dotted wire C would be very highly stressed indeed. In order to overcome this difficulty king-posts have been commonly used, as shown in fig. 2. This gives improved wiring angles, but they are not to be compared with those of the girder-constructed biplane, as indicated in fig. 3. Here there are no acute angles at all, and the tension wires can consequently be thin and light for the same factor of safety.

Fig. 4—the triplane—is simply one girder on the top of another, and furnishes equally good, or better, wiring conditions.



Figs. 1 and 2.

of the passenger, whether he be gunner, observer, bomber, or mere joy-rider.

Taking these considerations in the order given above, we can easily see how the monoplane compares with the triplane and both with the biplane. It should first, however, be pointed out that the prevalence of a type may be due to what are more or less accidental causes; thus it is undeniable that the vogue of the

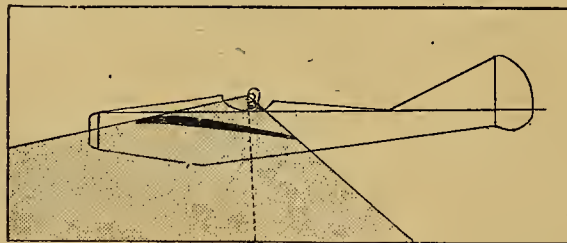


Fig. 5.

biplane, in this country at all events, had a good start for the simple reason that in 1912 and 1913 there were a rather large number of monoplane disasters—it was a case of "give a dog a bad name"—which could not, however, properly be ascribed to any particular faults of the type as a type. The same accidents might have easily happened to biplanes or triplanes—at any rate to the majority of them.

Considering the three machines purely as engineering structures, it is clear that the advantage lies with any multiple plane arrangement in which the girder principle of construction can be employed. The monoplane employs the cantilever system. Both, of course, depend upon the rigidity of the triangle, and consist of stiff members in compression, braced with lighter

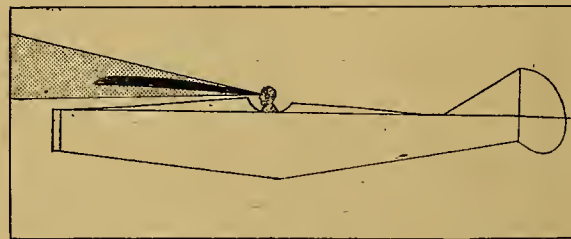


Fig. 6.

Constructional strength has, of course, an immediate influence on the weight of the machine. Considering the wings only (and supposing that the remainder of the machine remains the same in all cases), and granting them equal surface and equal loading, we find that the wings are considerably heavier in the monoplane than in either the biplane or the triplane, and that as between the last two there is a slight advantage in favour of the triplane. For very small machines the difference all through is not very great, but it increases, as between the monoplane and the multiplane, disproportionately with increase in dimensions.

Another point that has to be considered is this, that in the monoplane the main wing spars must be very big lengths of timber, which are hard to obtain and



**Flying Facts and Theories.—**

very expensive, whereas in the biplane and triplane shorter and much lighter pieces are employed.

**The Aerodynamic Aspect.**

From the aerodynamic standpoint a monoplane is, on first principles, clearly the finest possible form of supporting surface, *i.e.*, as an efficient aerofoil. In the biplane one surface must have an effect upon the other, and it is probable that this effect is in the direction of loss in efficiency. On the other hand,

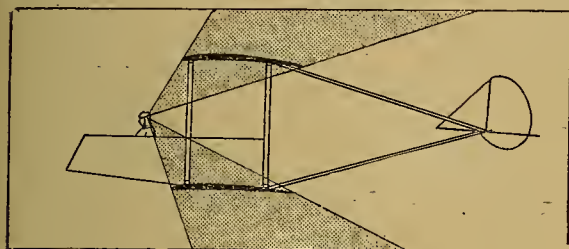


Fig. 7.

the heavy wiring and king-posts of the monoplane structure come within a measurable distance of neutralising the disadvantageous resistance of the additional interplane struts in the biplane and triplane. The great weight of the monoplane wings, providing as it does a sort of flywheel in the horizontal plane, may exercise a certain amount of influence on control. From the practical aerodynamic standpoint, therefore, the biplane and triplane are to be preferred to the monoplane for any but very small machines.

**The Point of View of the Pilot.**

Turning now to a consideration of the requirements of the pilot we find that, other things being equal, the best type of machine is that in which he has the best view of things below, around, in front, and above him. In the ordinary type of monoplane, fig. 5, the downward view is very much restricted by the wings, portions of which, adjacent to the body, will probably have to be cut away, thereby increasing head resistance and slightly reducing lift. If the plane is mounted "parasol" fashion so as to be in line with the pilot's eyes, his "blind angle," as shown in fig. 6, will be very small indeed; but, on the other hand, aerodynamic disadvantages are now introduced, inasmuch as the centre of thrust will be below the centre of resistance. The centre of gravity will also be considerably below the centre of lift.

In a pusher biplane or triplane the pilot can have an almost completely unrestricted view except above and behind, fig. 7 (the tractor and pusher types will

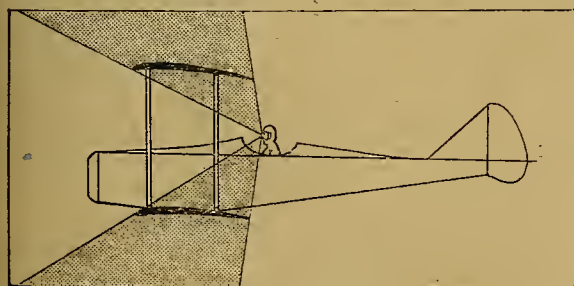


Fig 8

be considered in a future article), whereas in a tractor biplane of the ordinary type, in which the planes are of equal chord and directly opposite to one another, a good deal of the view is cut off (fig. 8). By staggering the planes, using a large surface above and a small one below, and putting the pilot on a level with the top plane, the "blind angle" can be very much reduced, and having regard to the fact that the pilot has always a certain latitude of personal movement, the conditions of view (fig. 9) closely approximate to those of the parasol monoplane.

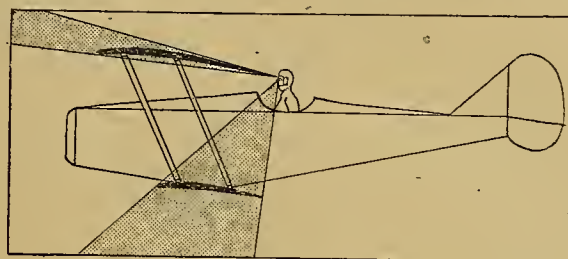


Fig. 9.

In the triplane the best that can be done is to set the pilot's head on a level with the middle plane, in which case both the top and bottom planes introduce a direct obstruction to his sight, as shown in fig. 10.

**Weight-carrying Aeroplanes.**

As at the present time all aeroplanes are designed for war purposes, the question of which type is most suitable for the comfortable and safe transport of passengers scarcely arises. For weight-carrying purposes of any kind, however, it will be seen that everything is in favour of the multiplane, whereas for single-seater fighters there is very little to choose between all three types, each of which has its representatives in the aerial forces employed in this war. Where the pilot has with him a passenger armed with one or more machine guns, as in numerous classes of machine, the biplane is the best machine for the purpose. With the pilot using a fixed gun and the passenger a movable one there is only a comparatively small area on which they cannot bring their weapons to bear without changing course, and they are considerably better provided for in this respect than in either the monoplane or the triplane.

The above notes do not pretend to be an exhaustive analysis of the situation. They deal only with the principal causes of the popularity of the biplane, and much more remains to be said both for and against each type respectively. Perhaps in a future article some of these less obvious points may be discussed, as they are not without interest.

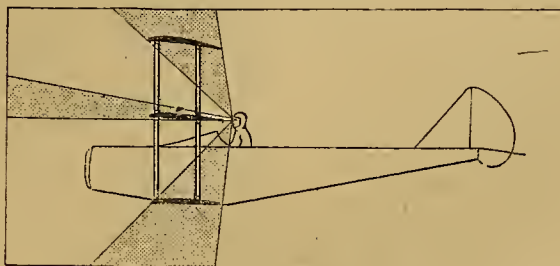


Fig. 10.



# MILITARY NOTES.

## M.T., A.S.C., AND THE FIRING LINE.

### THE QUESTION OF PAY.

CPL. H. S. ROBERTS refers to that sore point, the question of A.S.C. and infantry pay, and summarises the whole matter in a nutshell by saying that the infantry soldier is admittedly underpaid, and that the Government required drivers in 1914 and offered 6s. a day—the drivers themselves did not ask for it.

### THE M.T., A.S.C., AND THE FIRING LINE.

THE letter from "O.C. Taxicabs," published in our issue of September 20th, page 274, has prompted many A.S.C., M.T., men to write us denying the allegations that the A.S.C., M.T., deserve the name that has unkindly been given to them of "Army Safety Corps." The following letter from Sgt. O. J. P. Senior is interesting, in that the writer has served not only with the A.S.C., but also with the infantry, and we produce his letter in full herewith:

"I write to you as a re-enlisted man now serving 'In the Field' with the A.S.C., M.T., having previously served eighteen months in the trenches with the Lincolnshire Regiment. No doubt you will agree with me that with the experience I have thereby gained I should be in a position to speak where the respective dangers to which various units are exposed are in question.

"It was with a feeling of greatest indignation that I read J. W. Pearson's letter in the issue of September 20th. I should very much like to know in what part of the line Mr. Pearson asserts that the M.T.'s were conspicuous by their absence. I wish to make it known to you that I am continually up the line within a thousand yards of the Boche trenches, and have times out of number seen in broad daylight anything from thirty to fifty lorries conveying ammunition to the guns (not to horse transports).

"Many infantrymen coming down from the trenches I have heard say to our drivers: 'Blime, mate, I'll take me 'at off to you on your job; why, you are a target in yourself with that lot behind you.' I can honestly say that I have never been in hotter corners with the 'Lincs' than I have with the M.T.'s."

### THE MOTOR CYCLISTS' VIEW.

THE "B Sharps" write to us as motor cyclists attached to the A.S.C., M.T., in very much the same strain as Sgt. Senior, and they point out the difficulties encountered by them in the execution of their duty when they are stationed in advanced dressing stations. They say: "We have been stationed in advanced dressing stations in front of the eighteen-pounders, and have had to go underground while Fritz strafed the place, the cars above being riddled with shrapnel. We have seen ambulances blown up while waiting and lorries blown to pieces while they were feeding the guns at the gun pits.

"We fully realise that there are plenty of A.S.C., M.T., men who, although serving in France, have never been under shell fire, but there are many others whose duties, as in our case, are always in the danger zone, and we think it is not right to class them all as holders of cushy jobs."

### THE ABSURDITY OF THE POSITION.

ANOTHER correspondent, signing himself simply "Sergeant," seems to strike the most reasonable attitude when he asks if the critics of the A.S.C. expect the lorries to be taken into the trenches. In his opinion the lorries are taken as near the front line as is possible.

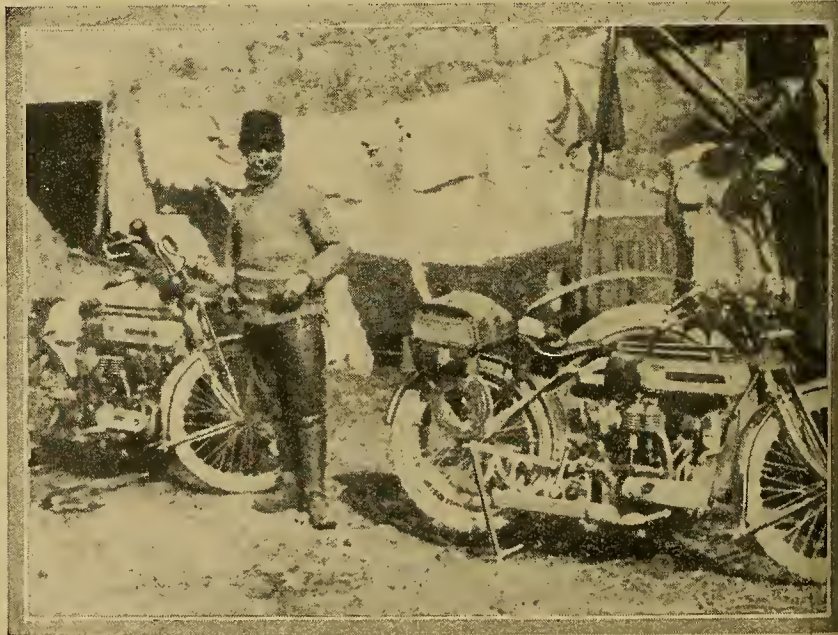
"When you get an advanced dressing station in the rear trenches, or go up every night to the trench railway for wounded, is that not enough? The shrapnel holes in my cars could be counted by scores, and I knew four ambulance cars blown up and others set on fire during my time. What about the ammunition dump in the village west of —, when the M.P. stopped the convoy because the village was being shelled, and the whole batch went up, lorry engines being blown into the fields, and no trace of any M.T. man being found? And how many ration lorries have been blown up at railhead in —? Why, I have had M.T. men killed and wounded when back resting; and in —, before the advance, and when the streets were under machine gun fire from the Boche trenches, there were, to my knowledge,

hundreds of ambulances and drivers there under fire. The fact is that an M.T. man on a field ambulance has got to go through it, drive over shell-swept roads and get as far as he can, so that the poor devils carrying stretchers have not so far to go. And—which is a very strong point—he has no trench to hug down in. He is at it twenty-four hours out of twenty-four in a stunt, his roads are all properly taped and strafed by Fritz, he is in the rotten position of being 2ft. above anything bursting on the ground, and he knows he is seen from the observation balloon. Many drivers can tell you of having their wounded killed or again wounded whilst going to the C.C.S. from the A.D.S. I am writing of facts, and can give the names of the drivers and the W.D. numbers of the cars, the latter in some cases being riddled.

"The whole thing is really not worth any discussion; but if we are to talk about it, let us have true facts. It seems to me that there is usually some personal jealousy, which causes writers to belittle the part the M.T. man is playing, and I am sure he is not parading his work."

### WHEN?

A TOPIC of much interest in flying quarters is the much-talked-of Imperial Air Service. The question asked is, when will the Royal Flying Corps and the Royal Naval Air Service amalgamate, and form the perfect homogeneous whole? Speculation is rife, but the date is as uncertain as is the pattern of the mysterious new tunic.



M. Doubost, who was, before the war, often seen at race meetings in France. He was an exponent of the René Gillet motor cycle, and rode from Marseilles to Paris from the rise to the fall of the sun, establishing a record not yet broken. Doubost was until recently a D.R. in a heavy artillery group.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### DATE OF SECOND-HAND MACHINES.

Sir,—I read with interest your article on advice to buyers of second-hand motor cycles, wherein you state that the prospective buyer should write or wire to the makers for the date of the machine. A friend of mine did this to a "trustworthy" firm of motor cycle makers, and the reply, which I have before me, informed him that they only give the date to the original purchaser—which is, of course, silly, to say the least of it.

If firms will not give anyone the date of manufacture, the least they could do would be to cast the date on the crank case, as Messrs. Douglas Bros. and one or two other makers do.

I should be glad if you would bring this before your readers' notice.

J. R. C. RICHARDS.

#### PETROL CONSUMPTION.

Sir,—I read with considerable interest in *The Motor Cycle* of Sept. 27th, page 299, re petrol consumption, enquiries from Mr. Anderson. I might here mention it is quite possible to get 200 miles per gallon on a  $3\frac{1}{2}$  h.p. motor cycle. As far back as 1903  $3\frac{1}{2}$  h.p. machines which were fitted with my patent economiser averaged 178 and 198 miles per gallon in open competition. I much regret not being able to devote my attention to the saving of petrol for your readers, as my time is much taken up in national work in the Royal Naval Air Service.

I sincerely look forward to the near future when we shall get the good old days of competition. I venture to predict, after making a careful study of all aero engines which have passed through my hands, some wonderful improvements will be introduced in internal combustion engines.

After seventeen years of motor cycling and competition riding I find the aero engines will now help to bring about a perfect cycle and car engine.

FRANK WHITE.

#### GEAR BOXES FOR LIGHTWEIGHTS.

Sir,—I note your correspondent raised the question of weight of gear boxes for a lightweight machine, and as this is often urged as an objection, I should like to give a few simple figures which should destroy this delusion. Take a machine weighing 140 lb. all on and a rider of 140 lb., or 280 lb. for the "combination." Now add a three-speed gear box weighing, say, 20 lb. This means that the total weight has been increased by 7%, while climbing power (with a range of gears of 5-15 to 1) has been increased 300%. This shows the absurdity of objecting to the weight of a gear box. Even if a gear box weighed half the weight of the machine, i.e., 70 lb., it would still be worth putting on. Most riders seem to forget that it is only during one-third of the mileage covered during the year that weight counts at all, since on level roads weight is no objection, whilst downhill it is a positive advantage. To object, therefore, to increase weight by such a trifle as 7%, whilst increasing pulling power by 300%, is, to say the least of it, absurd.

M. HITCHCOCK.

#### INTERNAL COOLING.

Sir,—May I suggest that the discussion on "Internal Cooling" now going forward in your pages might be made more profitable if more emphasis were laid on the two entirely distinct aspects of the question? As I take it the problem is this: Although the top and sides of the combustion chamber of an engine are provided with more or less adequate means of cooling, yet the base of the chamber (which is, of course, formed by the top of the piston) is uncooled, with the consequence that its temperature becomes

excessive. Now this circumstance may impair the running of the engine in two totally different ways. If we consider (1) the upper or combustion chamber surface of the hot plate of metal forming the piston top, there is clearly a danger of trouble due to pre-ignition and undue carbonisation. On the other hand (2), dealing with the lower surface of the piston head, this surface is freely splashed with lubricating oil from the crank case, with the result that some of the oil is burnt or volatilised, while the lubricating properties of the remainder are vitiated, with consequent risk of damage to the bearings.

Had your contributor "Engro" confined himself more carefully to one or other of these viewpoints in his article "Cooling and Lubrication," his remarks would have been much more convincing. From the second aspect just mentioned, that of preserving the quality of the lubricating oil, it is manifestly an admirable idea to insulate the piston top in the way he suggests; but when he proceeds to argue that such a scheme will also result in a cooler-running and more efficient engine I am afraid he has gone rather badly astray. If insulating the piston, and thus stopping the passage of heat from the combustion chamber in that direction, produces such gratifying improvement, why not carry the process a step further, and swathe the whole cylinder in asbestos wrappings? No heat at all could then escape from the engine, and since, according to "Engro's" reasoning, the heat thus entrapped would perforce be expended in useful work on the piston, we should have a super-efficient engine indeed! I confess I could not quite follow all the arguments your contributor put forward, and so I cannot put my finger on the spot where he took the wrong turning, but that he has got on to the wrong track is pretty evident by following the track to its destination as I have done above.

H.A.

Colchester.

#### COOLING FINS.

Sir,—At the conclusion of the article (October 11th, page 345), where the writer finds the required depth of fin to be .73in., we have the following:

"Another important assumption will have to be made, and that is the temperature rise of the air before and after entering the fins. This is usually taken at 8°F. The air will then possess  $1,045\frac{1}{2} \times 8 = 8,360\frac{1}{2}$  B.Th.U's."

There is an error here which considerably alters the conclusion arrived at. If  $1,045\frac{1}{2}$  lb. of air are raised 8°F., the B.Th.U's required would be

$$1,045\frac{1}{2} \times 8 \times .237 = 1980\frac{1}{2} \text{ B.Th.U's}$$

where .237 = specific heat of air.

In consequence of this the depth of fin  $h$  would come out at 3.2in. Some fin!

Speculation on a problem of this description is both useful and interesting, but, on the whole, it does not seem wise to put down figures which are necessarily all based on assumptions, and have no experimental data to back them up.

For example, it may be that another student of this problem would consider 75 m.p.g. a more representative figure for a  $3\frac{1}{2}$  h.p. machine at 25 m.p.h., and that even then its average horse-power might be, say,  $2\frac{1}{2}$  h.p.

Also, that in calculating the air passing and being heated by the cylinder he might assume the quantity of such air to depend either (1) upon the cross sectional area of cylinder exposed or (2) upon the total area of radiating surface, instead of upon the cross sectional area of the grooves.

Amongst such a variety of possible assumptions who is to say when the correct ones have been made?

C.R.E.

Baildon.



**AVERAGE SPEED.**

Sir,—After reading the letter from "Zeno" in your issue of September 20th, I feel called upon to make some reply to his not too courteous suggestions *re* "George Washington" and others, particularly as his reference to "nine miles at 64 m.p.h." leaves no room for doubt as to whom he was getting at.

He is very pointed in his denunciation of "road hogs," who "blind round corners . . . and endanger the lives of little children," and in the next few lines tells us he can do 45 m.p.h. with sidecar and 55 m.p.h. solo on "clear country roads." I think I distinctly stated that my nine miles in eleven minutes was done on a practically dead straight road, without villages or cross-roads.

"Zeno" appears to have missed the main point of the whole discussion, which was, I believe, to obtain an opinion as to what average speed on long and short runs was possible, not what motor cyclists habitually did.

It has been suggested to me by some of my chums who have read "Zeno's" letter that possibly his trouble is a matter of "sour grapes," for if 55 m.p.h. is his best speed with an 8 h.p. twin solo his engine must be in a very bad state, or very badly tuned, and he would be well advised to seek expert assistance for the engine's sake, even if he does not want the extra speed and power.

I would like to say that, in my opinion, a sidecar outfit travelling at 45 m.p.h. is infinitely more dangerous to its riders and others than a solo machine travelling at 55 m.p.h.  
B.E.F. ELDON.

Sir,—I have been very interested in the articles in your paper *re* "Average Speed," and I thought it might interest you to know what a little 2½ h.p. Douglas can average under service conditions.

For some time past I have been doing a run of exactly twenty-six kilometres (by kilometre stones and speedometer), and on very many occasions I have done this run in twenty-five, twenty-six, and twenty-seven minutes. This road is in very good condition for France, and, with the exception of one short, sharp hill, which can be taken on top, is almost level. This, I think, is very good for a stock W.D. model. This engine has now been in four different frames, having been transferred on each occasion of frame breakage.

In my humble opinion, the flat twin is the ideal mount, and will certainly come into its own when the war is over.

The present W.D. Douglas could be improved in the following respects: Three speeds, kick start, hand-controlled clutch, foot brake, and mudguards. If these defects were perfected, a better machine for handiness and economy would be hard to find.

I am just completing thirty-eight months' active service, and have in that time ridden E. and M., Singer, Rudge, B.S.A., Triumph, and 2½ h.p. and 4 h.p. Douglas machines, and so have some slight knowledge of D.R. work, even if it be in the A.S.C. And I assure you that it is not all honey, nor are all A.S.C. jobs "safe," as some of the armchair critics seem to think. I wish I were in a position to publish a few facts regarding the casualties of a certain "siege park" for the past few weeks, also a few "supply columns" which really *do* see life when up on R.E. work, all of which I suppose would be called safe jobs.

I regularly receive the "Blue 'Un," and it does quite a little round before it is finally scrapped.

B.E.F.

OUT SINCE MONS.

**THE PETROL POSITION.**

Sir,—I write on behalf of a number of engineers who are engaged on very important munition work. Our work necessitates our attendance seven days one week and six nights the alternate week; and we have been doing this almost constantly since August, 1914, our leisure consisting of a few hours on Sunday afternoon (after leaving work at 6 a.m.) once a fortnight. Some of us who possess motor cycles are in the habit on our Sunday afternoon off duty of taking our wives and children a few miles out of town to breathe the air of the countryside, recuperating from our confinement of the previous fortnight and adding to our efficiency at work on the following days. Even with this meagre allowance of recreation we are convinced that we are undermining our health and materially reducing our years of life, and we hope that, after the essential businesses have got sufficient petrol to carry on, consideration will be

shown to the men who are sacrificing their leisure hours to the winning of the war, and an allowance of petrol, however small, granted to enable them to leave their unhealthy surroundings for a short time. The motor cycle is our only hope, as we are too tired to walk or push-cycle after a week of night work.

W. WRIGHT,

Hon. Sec., East Gun Shop (Vickers, Ltd.) M.C.C.

Sir—My position is as follows: The Petrol Committee was good enough to grant me two licences, viz., one for three months at the rate of four gallons per month, and the other for twelve gallons at the rate of two gallons per month; the latter expired on the 30th September last.

I made a further application on the 10th September on the prescribed form which I received from the Petrol Control Department, and accompanying it was a letter from my employers, the Flintshire National Health Insurance Committee.

In face of my strong appeal for a renewal of my licence, I was greatly disappointed to receive a printed circular letter informing me that my licence could not be renewed.

My petrol consumption is one gallon per week; my average mileage is 100 per week, and my machine is a 4½ h.p. B.S.A. It will be seen, therefore, that my requirements have not by any means been over estimated.

The train service (apart from being too costly) is, owing to its being reduced, most inconvenient.

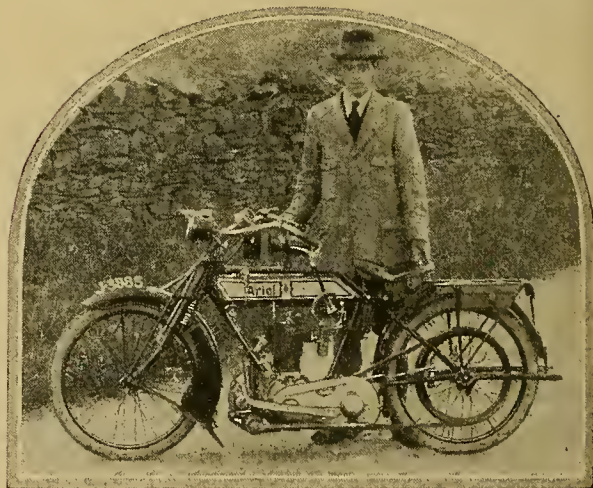
I am a discharged soldier. I joined the Forces on the 4th August, 1914, and after nine months' service I was invalided out of the Army (as the result of an accident) as not fit for further military service. Previous to enlistment I did the journey on an ordinary cycle, but now I am not physically fit to do it.

I think you will agree with me that, inasmuch as I have served my country, the least thing the Control Committee could do was to give my application more justice in return for services rendered.

My application is genuine throughout. There are no pleasure trips available on the quantity of petrol asked for in comparison with the mileage (on hilly country) to be done, which is solely on business grounds.

Although I am only asking for one gallon per week there are ways and means open to me whereby I could consume five times as much petrol in the week, by hiring a motor car from the local garage. It is evident that the Petrol Committee does not give due consideration to the applications for licences where they are most deserving.

RICH. D. WASS.



Dr. W. H. McGranham, of Crook, Durham, the enthusiastic owner of a 3½ h.p. Ariel. This he considers to be an ideal machine for a medical man, and states that no other machine has given him such satisfaction, its easy starting helping him to get over a large district daily without fatigue. He rides with comfort over all kinds of roads, some of which are not too good. The petrol consumption is about seventy miles per gallon, and the work includes frequent starting and stopping at different houses. The Ariel, he affirms, behaves in a very satisfactory manner in a hilly district.



## MOTOR CYCLING FOR THE MAIMED.

Sir,—I have lost my right leg just above the knee, and the question before me is this: Shall I be able to ride a motor cycle? Before joining the Army I had never gone beyond a few short runs on my friends' machines, and my knowledge of motors does not go beyond the most elementary stage.

Possibly some of your readers in the same unfortunate position as myself have already had some experience of motor cycling since they have been fitted with artificial limbs, and could help me with their advice. Could I ride solo, or would it be necessary to have a sidecar also? Of course, I am presuming that the bicycle would have a kick-starter; but if an artificial limb would not depress this correctly, could this be fixed on the left side of the machine? This is a real cause of anxiety to me, and also to others that I know of; and as they will not take as students in the motor school here any who have lost their natural knee, we cannot get much help in that quarter.

Brighton.

HANDICAPPED.

## THE CRITICS.

Sir,—I read in your issue of August 30th a letter from "Ex-Sergeant, M.M.G.," criticising American and British motor cycles in favour of the latter for Colonial use. Before expressing my opinion, let me say that I passed through the Rolls-Royce works as a mechanic, and had for the last few years a position as a foreman in a large garage in New Zealand, and so can claim a reasonable amount of Colonial experience, and consider that I am entitled to express a Colonial opinion.

Your correspondent asks if the Americans wiped the floor with us at the T.T. races, and do they do it in the Colonies? Now, T.T. conditions have no resemblance to Colonial conditions in New Zealand. American machines, with or without sidecars, can get into places and out again where our machines cannot go at all, and ours cannot hold a candle to theirs for up-country use off metalled roads.

Please understand that I am a Britisher, but in fair play must give honour where honour is due. The best types of American twins we have out there are the Indian, Big X, and Harley-Davidson, and the Henderson in its own class. I have seen the Big X put up the Australasian grass track records for ten and fifteen miles, and no British machine ever lives with them. The very essential points which British machines lack for Colonial use, the Americans possess, and that is why they are the best for us. The British manufacturer will not cater for us properly, and the Americans do all round and in every way, so that I go plump for an American if I live to get back to God's own country. They have ample reserve of power, good ground and mudguard clearance, and hand-controlled clutches, large wheels and tyres (a necessity on our bad roads), and some of them a spring frame. Their wheels are so strongly built that they never break or get dents in the rims, and none have to be rebuilt through fair usage.

To turn to the British machines, I once rode 185 miles in New Zealand on a 2½ h.p. Douglas in nine and a half hours, but the last fifteen miles had to be done in low gear, and often I had to push Dugger through stiff mud 8in. and 1ft. deep, and silty sand, too. In my humble opinion, the Dugger is the finest lightweight in the world, but is not powerful enough off metal roads. The faults in them and all other machines from Blighty (for Colonial use) are too little mudguard and ground clearance, wheels not strong enough and too small (they should be 28in. x 3in. tyres), and every machine should have a hand-controlled clutch and a spring frame. The only British machine that seems in any way up to our requirements is the 6 h.p. V twin James.

With most of us out there a sidecar turn-out is a business proposition, and we would rather have only 60 m.p.g. and get there surely, than 80 m.p.g. through a smaller engine, and have the annoyance of being stuck up a few times.

France.

SAPPER, N.Z.E.

Sir,—The following in reply to the letter of "Howitzer, R.G.A.," dated August 16th, which, although somewhat belated, I trust you will publish.

There are several points in that letter to which I, in common with other D.R.'s, object greatly. To begin, does "Howitzer, R.G.A.," intend to be funny or insulting in

his remarks anent D.R.'s intellect? If the latter, I would suggest that he either shows lack of observatory powers, or we "do not cast pearls before swine." I do not call "How." a swine, but let him puzzle out my meaning.

Why take a Harley or a Henderson to illustrate silky silence? Why not a Scott, or a twin-opposed machine, and have something British? Volumetric efficiency may not concern the private owner to any extent, but "How." overlooks the fact that it does concern the manufacturer, for otherwise he must build big, and thus act against his own and the owner's ultimate interests by increasing size and weight for the same road efficiency.

I contradict his statements *re* American machines.

If we do not possess so great a lead as previously it is mainly due to tariff restrictions, and not to the manufacturer. He mentions the two-stroke. Does he know that America was the home of the two-stroke, and yet it remained for a British firm to produce the first really efficient and sound two-stroke machine, i.e., the Scott? Now where does U.S.A. lead (on land)?

Let him produce pages of facts and figures, but performances count, and he should remember that most of the Yankee "startlers" have been done with engines exceeding our average c.c. Naturally he will say this is a point against volumetric efficiency; possibly, but what Yankee machine of 500 c.c. has ever equalled the performance of the Scotts, and later the Rudge in the T.T., or, again, what machine beats the all-round capabilities and efficiency of the Enfield and the Matchless combinations?

I agree that weight and price must drop, and that we need to hustle, but not for the reasons quoted by "Howitzer, R.G.A." If he has designed engines he will understand that several things may seem desirable on paper, but when building begins a compromise is often necessary. After all, "the awful pile of wires and sprockets, etc.," is also an awful exaggeration, for the motor cycle is also a compromise between car and light car, and consequently, having the efficiency of both, you cannot have all their refinements without extra weight, which latter is mainly what we do not want. If "How." requires more power, let him give his attention to eliminating transmission losses.

Finally, no Yankee machine would stand the prolonged gruelling of Macedonian despatch riding; the frame perhaps, but not the engine or the fittings.

I must apologise for a long letter, but "Howitzer, R.G.A.," should not insult people who are working on service whilst he apparently is snug in London, S.W.

G. H. DURSTON, D.R., R.E. Signals.

Macedonia.

## OVERHEAD VALVES IN FLAT TWINS.

Sir,—I have been very much interested in the arguments concerning flat twins. A point I have seen repeatedly raised is: An overhead valve flat twin engine eats up plugs and valves. Why does not a properly designed overhead valve flat engine run cooler than the orthodox single? I am perfectly aware that the extremely numerous small parts prevalent in an overhead valve flat engine, being exposed, are more liable to wear and the consequent maladjustment. I have found that the majority of flat twins suffer from the same fault, viz., ports are much too small and narrow. The valves should be as large as possible. I am aware that the inlet valve must not be too big for a given size cylinder, because of the loss of power at slow speeds, due to the slow velocity of the new gas being unable to keep petrol-gas in suspension; but what of the exhaust valve? Its function is to allow the gas to escape, not to keep it in. To obviate two sizes of valves, both valves should be the same size, and the inlet gas controlled by port and inlet pipe. I have seen a well-known flat twin get red-hot after a climb up a stiff hill on second (with sidecar), and red-hot round the vicinity of the exhaust port, with consequent valve and plug trouble.

I should very much like to hear some of your contributors' views on the subject. C. H. DICKINSON (ARTIFICER).

## NOTICE.

The Editor disclaims all legal responsibility in any way for loss of copy in the form of manuscript, drawings, or photographs submitted to him. Rejected matter will only be returned provided a stamped addressed envelope is enclosed for the purpose.



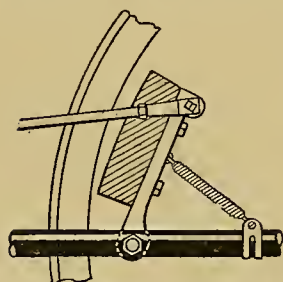


## BELT RIM BRAKES.

### COMPENSATING AND OTHERWISE.

THE artificer had inadvertently broken off the curled-up lip at the end of a brake shoe, but a rivet also prevented the pad from sliding out, and he offered to stake his week's pay that the fibre would never desert its post. The corporal insisted on condemning it, until the company "authority" superciliously reminded him that the old-type Triumph rear brake pads are held only by rivets and not by end stops on the shoe. The N.C.O. was momentarily nonplussed, but succeeded in ejaculating, "Well-er, but that's different," before he suddenly noticed that his presence was required some considerable distance from the vicinity of that particular brake.

The incident served to open a little discussion, during which the artificers agreed that while some types of belt rim brake are theoretically better than others the latter may score in practice by reason of their simplicity and avoidance of complication, and are thus preferable where reliability and accessibility are required, as in D.R. machines.

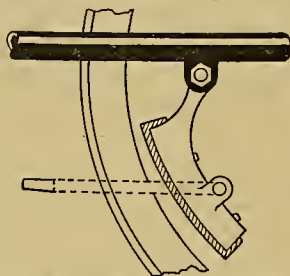


An almost extinct type. Shoe above fulcrum. Fierce action. Vibration and strain on frame. Strong "pull off" spring needed.

In designing a belt-rim brake the greatest difficulty is the maintenance of concentricity between the shoe and the braking surface, whether the brake is only lightly applied or has the maximum pressure exerted upon it, for if this is not achieved the pad is bound to wear more at one end than the other. Various compensating devices are used to effect the desired end, but only two machines—the Scott and Zenith—attain it by the same simple means as in the ordinary Bowden front brake, *i.e.*, by radial motion of the shoe from the wheel centre.

With brake shoes which are rigidly fixed to the swivelling arm it is impossible for the pad to come evenly in contact with the rim until the full pressure is applied, thus causing one end of the pad to wear out before the other; but this type is extremely smooth in action when the shoe is arranged below the fulcrum of the lever so that the rotation of the wheel tends to release the brake. Greater power is obtained with the shoe in the uppermost position, but greater stresses are thrown on the frame through the

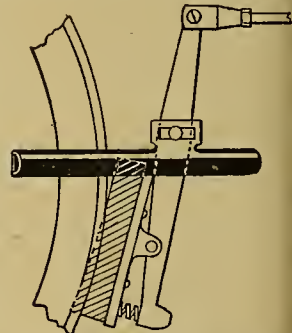
tendency of the pad to bind on the rim and be carried around with it; a much stronger releasing spring is required also. The danger of binding is obviated in brakes of the compensating type by the device which causes that part of the pad which is below the pivot of the shoe to meet the rim first as the brake is applied and disengage last as it is released, but it should not be forgotten that if the top part of the pad reaches the rim first binding must result; and, consequently, to avoid unpleasant skids on greasy roads, riders are advised to keep the brake parts well lubricated, free from stiffness, and particularly to note that the compensating spring functions correctly.



Early Triumph pattern. Smooth action, self-releasing. Shoe below fulcrum.

An excellent example of the manner in which the pad may be arranged concentrically with the belt drum at all stages of application by means of a compensating lever and spring device is found on the Rudge, and the flat friction surface of this brake eliminates any chance of binding.

Although the V pad working inside the belt rim groove has become the established type, it is scarcely so sweet in action or as durable as the earlier forms where the shoe lay at the back of the belt rim. However, there is no gainsaying the superior accessibility of the wheel with the popular variety, and when it is used without a compensating arrangement it forms the simplest brake possible, and is the ideal for military machines where multiplicity of parts must be avoided.

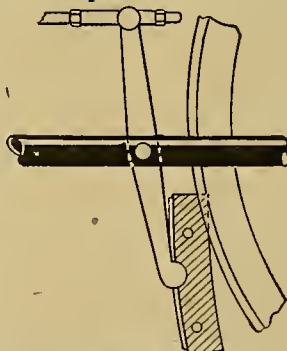


Compensating type (B.S.A.). Even wear on pad. Smooth action (depending on correct action of compensating spring).

Given correct curvature of the pad and a thoughtful disposition of the fulcrum, unevenness of wear on the braking surface is so slight as to make the compensating device unnecessary. WHARFEDALE.

### SAVING PETROL.

The director of the Petroleum Executive recently stated: "The impression exists that the shortage (of petrol) is not a serious one. I assure you that there does exist a very serious shortage, and it is the duty of every citizen of the State to economise to the last drop."



W.D. Triumph. Non-compensating. Smooth action. Minimum number of parts.



# QUESTIONS & REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, 'The Motor Cycle,' 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of the envelope, and should be kept distinct from questions bearing on technical subjects.

## Replacing a Douglas Cylinder.

**?** As I have accidentally broken the front cylinder of my 1915 Douglas, I am told that any cylinder of the previous two or three years will fit. Could you please inform me if this is so, as it appears to be difficult to obtain a 1915 cylinder?—N.V.H.  
You would be able to fit a 1913 or 1914 cylinder to your machine.

## Inlet Valve Timing.

**?** On a 4 h.p. engine the inlet valve opens when the piston is at the top of its stroke, remaining open during the suction stroke, and does not close until the piston is half an inch back up on the compression stroke. Is this right? I understood the inlet valve should close when the piston reaches the bottom of the suction stroke, to prevent the charge going back to the carburetter.—W.H.P.

So long as there is no blow-back from the carburetter the timing may be taken as approximately right. There is rather a long dwell on the cam, but evidently the makers find this suits the engine. The inertia of the gas should prevent any back flow to the carburetter.

## Side Play in Bearing.

**?** I have a 1916 2½ h.p. Imperial-Jap engine motor cycle. On taking the cylinder off to decarbonise it I find that the connecting rod can be rocked to and fro sideways, but there appears to be no up and-down play. Will you kindly tell me whether it would be unwise to run the engine in this condition? To repair it, must the engine be taken out of the frame? I take it that the crank case would have to be taken in half. Can this be done without interfering with the timing, etc.? I have very little knowledge of the timing mechanism. It is practically impossible to get repairs and adjustments done by the repairers; the only way is to do them oneself.—H.J.  
Provided there is no vertical play, we do not think you have any cause for anxiety, and no repairs are needed. Re-bushing the big end would, of course, necessitate taking the whole engine adrift, and separating the flywheels. To help you to understand the timing of an engine we should strongly recommend you to read "Motor Cycles and How to Manage Them," which can be obtained from these offices price 1s. 10d. post free.

## Running on Paraffin.

**?** (1.) Can I run, with satisfaction and without fear of injury to the bearings, etc., a 3½ to 4 h.p. combination on paraffin if I start on petrol? (2.) Would a water-cooled engine or an air-cooled be preferable?—A NEW READER.  
(1.) The average motor cycle and side-car could be run on paraffin if you start first of all on petrol; use a heavy lubricating oil, and take the air in warm. It will not develop so much power, and will be inclined to knock, necessitating an early change of gear. (2.) It does not matter whether you have a water-cooled or air-cooled engine, though naturally a water-cooled engine will not overheat, and would use less oil.

## IMPORTANT NOTICE.

### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

## Running a Two-stroke on Substitute.

**?** My machine is a 1914 Scott, and I have fitted a vaporiser. The heavy fuel in the float chamber (Binks carburetter) becomes quite hot, but the combustion seems incomplete and the machine runs very badly (on petrol perfectly), leaving a very heavy blue exhaust. It appears to me that the Scott is an impossible machine to run on a heavy fuel, as however hot the fuel may be delivered to the jets it is bound to become cool again in the crank case: so unless the crank case is hot any vaporiser would seem to be useless. Kindly say if my theory is correct, or if there is any means to get over it.—H.E.C.  
There are several Scott owners running their machines on pure paraffin, petrol only being used to warm up the engine. Evidently you have not enough heat in the main air intake, which is more important than heating the fuel in the float chamber. We hardly think that the gas becomes cooled in the crank case, as this gets quite warm after the engine has been running some time. We have

obtained far better results with substitutes on two-stroke engines—the Scott included—than on four-stroke engines, though the compression of the Scott is rather high for pure substitutes.

## A Floatless Carburetter.

**?** (1.) Would you please tell me if there is a floatless carburetter on the market; if so, from where can it be obtained? (2.) Is that over-cooling trouble to which "Chinook" refers due to an economical mixture?—SMOKE JACKET.  
(1.) A floatless carburetter was obtainable from the Service Co. in 1914. It was called the B.C.B. (2.) The engine runs at a lower temperature if the carburetter is feeding a correct mixture than if the mixture is too rich or too weak. Cool running cannot be described as a trouble, though with many car engines and some motor cycle engines it is rather a nuisance if the engine takes a considerable time to warm up to its best working temperature.

## Fork Spring Breakage.

**?** I ride a 1914 Triumph, fitted with a Sturmey-Archer three-speed hub gear. In order to improve the appearance, as I thought, I recently fitted a very wide handle-bar, similar to the Rover T.T. pattern. I have since broken two fork springs. Do you think the bar is in any way responsible for this? I may add the machine is very difficult to steer now. It runs well at slow speeds, but when a speed of 25 m.p.h. is attained a vibration is set up throughout the whole structure. I have tightened up all outside nuts, but all to no purpose. Do you think it is due to loose flywheels or bearings? Is this vibration liable to crack the frame? I do not want to dismantle the machine, as the nuts have nearly all got the hexagons worn off, and are very awkward to move.—"DUDLEY BUG" TRIUMPH.

We should say that the alteration to the handle-bars would not cause the breakage of the spring forks, unless the present design necessitated placing considerable weight on the bars, thus throwing the weight forward. In all probability, the excessive vibration is due to slack bearings, though all single-cylinder engines have what is known as "a period." Excessive vibration undoubtedly causes fatigue of the frame members, but unless the engine appears to be badly worn we think you can afford to ignore this point for the time being.



**Four-stroking.**

**?** I shall be very much obliged if you will tell me how to remedy (1) excessive four-stroking in a 2½ h.p. single-speed two-stroke fitted with a Senspray carburetter, and (2) how to improve the petrol consumption, which is very high. Lubrication is by petrol.—A.N.

We think that if you try the effect of fitting a smaller jet you will find that the engine will cease to four-stroke so frequently, and will also run more economically. An oversize jet not only feeds too heavy a mixture to the engine, but also feeds an excess of lubricant.

**Curious Magneto Trouble.**

**?** My machine, a 4 h.p. T.T. Bradbury, has given me every satisfaction and absolutely no trouble until just lately. I might here state that I am a motor mechanic by trade, also that I rode a distance of thirty miles about three weeks ago, and the machine ran perfectly. Recently I took it out, and it started in about three yards and ran splendidly for two miles, when, on climbing a fairly steep hill, it stopped dead, as though a magneto switch had been suddenly shorted. I pushed the machine, it started again all right and carried me still further up the hill, but stopped dead again. I took the plug out, and found it in perfect order and sparking well. I managed to get home, and completely removed the carburetter (Senspray) and cleaned thoroughly. I also looked to the contact breaker, fitted a new plug, and tried the machine again. It ran all right for about a mile, then started the same trouble again, viz., stopping dead without any warning. I got hold of the plug terminal and pushed the machine, but got no shock, so removed the plug, but could not get a spark. I therefore removed the rocker arm to make sure it was not sticking, took out the carbon brush, and examined everything, including the high-tension wire connections, and found all perfect. The plug sparked perfectly when I tried it again, but the machine ran only a short distance before causing the usual stoppage. However, it generally started again immediately after. The only conclusion I can come to is that it is the condenser which is causing the trouble (waterproof Bosch magneto). What do you think? Could you tell me any method by which I could test whether it is the condenser or not? I have had magnetos to pieces pretty often, but have never had cause to bother with the condenser. Do you think I could safely do the repairs myself, as I cannot afford the expense of sending it to an electrical expert.—W.F.

We note that there appears to be no current from the magneto, but in this you may very easily be misled. We would recommend you to remove the magneto and take it entirely to pieces, thoroughly cleaning it and drying in a warm oven. You may find that the slip ring is oiled up, or, more probable still, that one of the carbon brushes is sticking in its holder. We think you would have

no difficulty in doing this work yourself, as it is quite straightforward, and it is almost certain that a thorough cleansing and drying out of the magneto will remove the trouble.

**Contact Breaker Points.**

**?** I should be glad if you could advise me regarding my magneto. My machine is a single-cylinder 3½ h.p., about five years old, and the magneto is a Bosch as originally fitted. A few weeks ago it began misfiring at irregular intervals, which I put down to the platinum points being worn. I put some platinoid, which I was assured would answer the purpose, on both screws, but since then the machine will run only a minute or two on the road or stand, and then misfires badly until the engine stops. On turning the engine over by hand a spark appears regularly at the plug, but seems to be weak. I have removed and cleaned the armature contact breaker and carbon brushes, and have tested all adjustments, fitted new high-tension wire, new plug, and varied the timing, but without any result. I have also examined all points connected with carburation. Could you tell me if misfiring is likely to be due: (1.) To using platinoid instead of platinum? (2.) To the magneto requiring remagnetising? (3.) To a failure in the armature winding? (4.) Is there any way in which I could test for these points?—H.W.B.

(1.) This might be the cause if the material in question were at all impure, but, even then, if the points were clean the engine ought to fire for a mile or two without giving trouble. (2.) Probably the magneto is in need of an overhaul, which would include the remagnetising of the magnets. (3. and 4.) It is also possible that there exists a fault in the armature winding, but it is impossible to say without actually seeing the machine. The only way you can test this is by taking the magneto to pieces—a procedure which we do not recommend for the average amateur. Only an electrician can make a thorough test, so we would advise you to look through our small advertisements for a magneto repairer who is prepared to undertake such work.

**Carburetter Overhauling.**

**?** I should feel grateful if you would inform me of the correct method of adjusting a 1915 7-9 h.p. Indian carburetter. The machine has been down for overhaul, and the carburetter parts, etc., have been plated. The petrol level—main and pilot jets, and strangling cone seem all awry. How is the correct position of strangling cone ascertained?—D.M.

If the carburetter parts have been plated it is possible that the float chamber has also been treated, and loosely-deposited nickel has formed round the needle valve seating; and also the plating is quite likely to have caused the compensating parts to become a tight fit. All you can do under the circumstances is to send the carburetter to the makers to be overhauled.

**Uneven Running.**

**?** I have a 1916 2½ h.p. machine, fitted with clutch and kick starter. When running on top gear uphill, there is every few yards a jar as though I had run over a stone on the road. This does not occur on low gear or on a level road. The engine and machine run perfectly, except on top gear uphill. It feels to me what I should imagine belt slip would be like, but I have never been troubled with it to my knowledge. On taking the chain cover off and running the machine on the stand, I find a good deal of oil coming out of the shaft end, near the small sprocket. This splashes on the belt, and makes it very oily. How can I stop this oil leak, and what is the cause? What will clean the oil off the rubber belt without damaging it? What is the cause of the jar when going uphill on top gear, and how can I cure it?—F.N.G.

It is possible that the trouble is due either to the chain or one of the sprockets being very badly worn. Make sure that the gear lever is properly adjusted in relation to the gear position at the box. It may be that the top gear dog is not fully engaging, and jumps out against the pressure of the spring. Note the position of the striking arm on the gear box with the lever in top gear position, then disconnect the lever, and see if the striking arm will move the dogs further into engagement than the gear lever permits it to do. It sounds very much as though the defect were in the gear box or clutch. The leakage of oil may be due to a worn main bearing or to the need of a felt washer over the bearing. The most convenient means of cleaning the oil from a rubber belt is to use a rag *very slightly* moistened with petrol and wipe it over.

**RECOMMENDED ROUTES.****SHEFFIELD TO MORECAMBE.—B.W.**

Sheffield, Penistone, Huddersfield, Elland, Halifax, Keighley, Skipton, Settle, Wennington, Claughton, Lancaster, Morecambe.

**GRANGE-OVER-SANDS TO MALPAS.—J.R.**

Grange, Levens Bridge, Milnthorpe, Lancaster, Garstang, Preston, Rufford, Ormskirk, Liverpool, by ferry to Birkenhead, Chester, Handley, Malpas. Approximately 110 miles.

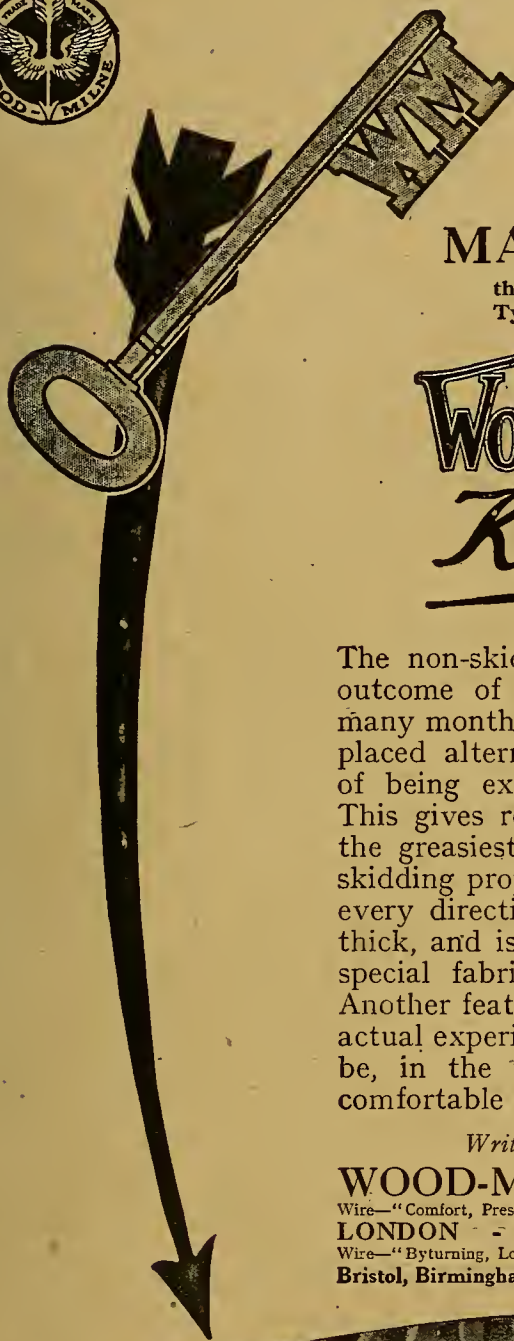
**PRESTON TO GREAT YARMOUTH.—W.L.**

Preston, Wigan, Warrington, Knutsford, Macclesfield, Buxton, Bakewell, Baslow, Chesterfield, Mansfield, Newark, Sleaford, Swineshead, Long Sutton, King's Lynn, Gayton, Litcham, Dereham, Norwich, Acle, Yarmouth. Approximately 240 miles.

**BIRMINGHAM TO ICKLESHAM.—J.C.R.**

Birmingham, Henley-in-Arden, Shipston-on-Stour, Woodstock, Oxford, Dorchester, Shillingford, Benson, Henley, Wokingham, Bagshot, Worplesdon, Guildford, Cranleigh, Horsham, Brighton, Newhaven, Seaford, Eastbourne, Pevensey, Bexhill, St. Leonards, Hastings, Icklesham. Approximately 200 miles.





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MC 507



AI8 All letters relating to advertisements should quote the number at the end of each advertisement, and the date of the issue.



## MOTOR CYCLES FOR SALE.

## Ariel.

1915 Ariel, 3½ h.p., 3-speed countershaft, with new Phoenix C.B. sidecar, usual accessories, perfect; £50.—Lloyd, Welland House, Spalding. [X6896]

ARIEL, 1915, 3-speed, and clutch, 5-6 h.p., spring seat-pillar, Dunlop tyres, hood and screen, Lucas lamp and Cowey speedometer; £71/15; extended payments or exchange.—Service Co., 292, High Holborn London. [X7098]

ARIEL, late 1914, 3½ h.p., 3-speed, coachbuilt sidecar, countershaft gear, tyres as new. Jones speedometer, wind screen, kick start, decompressor, excellent condition; bargain, £55.—76, Plum Lane, Plumstead, S.E. [X234]

## Arno.

3½ h.p. Arno, 3-speed Armstrong hub gear, good order; £20.—Jones' Garage, Broadway, Muswell Hill, N.10. [X1964]

ARNO, 3½ h.p., lighting set, in exceptional nice order and condition; £19.—Percy and Co., 337, Euston Rd., London, N.W.1. [X377]

## Auto-Wheels

GENUINE Wall Auto-Wheel, little used, splendid condition, complete; £28/10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X6730]

AUTO-WHEEL and Dingwall-Witham invalid tri-cycle, 2-speed, and free-wheel, band and rim brakes, all in new condition.—Hucklebridge, 133, Sloane St., S.W.1. [X7069]

## Bat.

BAT-J.A.P., 6 h.p., 2-speed, handle start, new coach-built sidecar, lamps, accessories; any severe trial; £32, bargain.—58, Maroon St., Limehouse. [X184]

BAT-J.A.P., 1915 5-6 h.p. Combination, 3-speed clutch, kick, Stewart, etc., 70 to gallon, good condition; trial; 48 gns., or lightweight part; no dealers.—186, Sydenham Rd., Sydenham, S.E. [X213]

BAT-J.A.P., 7-9 h.p., late 1915, twin, coachbuilt sidecar, 2-speed countershaft, clutch, kick start, sprung saddle and footboards, speedometer, lamps, horn, and spares; £50, or nearest offer.—Ellison, 29, Cross Flatts St., Beeston, Leeds. [X7064]

## Bradbury.

1913 4 h.p. Bradbury, new condition; 17 gns.—58, Maroon St., Limehouse. [X183]

BRADBURY, 1912-13, 3-speed, and coach sidecar, £35/10; 3½ h.p., 2-speed, chain drive, £24/10.—Motor Exchange, Horton St., Halifax. [X244]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Bradbury, 1914, 4 h.p., 3-speed countershaft gear, coach sidecar; 37 gns. (D) [X346]

BRADBURY Combination, Mills-Falford sidecar, P. and H. lamps, (three), and accessories, N.S.U. gear, enamel and plated parts lovely condition, very fast; £30.—Bunting's Motor Exchange, Mason's Av., Harrow. [X175]

## Brough.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Brough, 1916, flat twin, Sturmer countershaft gears; 57 gns. (D) [X348]

## Brown.

3½ h.p. Brown, N.S.U. 2-speed, in fine order; £22.—32 Jones' Garage, Broadway, Muswell Hill, N.10. Deferred payments arranged. [X1963]

BROWN, 3½ h.p., with new C.B. sidecar, 2-speed, free engine, lamps, horn, etc.; £28, or exchange with cash for higher power.—S.T., 10, Lansdown Rd., Seven Kings. [X1970]

3½ h.p. Brown, accumulator, in splendid running condition, enamel and plate as new, tyres good; a bargain, £12.—W. Sparks, 31, Broadwater Down, Tunbridge Wells. [X9090]

## B.S.A.

B.S.A., new models K and H, actually here; no waiting.—Moss Wern. [X6975]

COLMORE Depots, 261, Dennagate, Manchester, for quickest delivery of B.S.A. [X7098]

B.S.A., 3½ h.p., 1913, free engine, and accessories, in first-class condition.—Phone: East 1235. [X1922]

3½ h.p. B.S.A., 1914, clutch, Lucas lamp, Palmers, 2 perfect; nearest £30.—4, Macduff Rd., Battersea Park. [X7084]

1914 B.S.A., 4 h.p., all chain, kick start, 3 speeds, clutch, coachbuilt sidecar, perfect condition.—Leech, Granard, Ireland. [X7120]

B.S.A. 1917 Best Combination, Lucas accessories; cost £24, sacrifice (want of petrol) 79 gns.—Rev. George, Derbyshire Hill, St. Helens. [X263]

B.S.A., 1916, 2 lamps, mechanical horn, mileage 750. Phoenix sidecar, new; £60.—Williams, B.V.C., Parson's Green Lane, Fulham. [X317]

1916 B.S.A., 4½ h.p., 3-speed countershaft, kick start, clutch, electric lighting set, B.S.A. Canelet sidecar, in exceptional nice condition; £65. [X347]

1915 B.S.A., 4½ h.p., coachbuilt sidecar, in very nice order and condition; £58. [X348]

1916 B.S.A., 4½ h.p., in splendid order and condition, 3 speeds; £56.—Percy and Co., 337, Euston Rd., London, N.W.1. [X385]

B.S.A., 1913, 2-speed, in splendid order, very little used, just overhauled thoroughly by B.S.A.; any trial; £34.—Telford Garage, 47, Streatham Hill, S.W.2. [X144]



## NEW MACHINES ACTUALLY ON SHOW.

MATCHLESS, War Model, 8 h.p. Combination, 3-speed, spare wheel .. £120 0

MATCHLESS, War Model, with special lamps and horn ..... £125 0

NEW HUDSON, V.I.B. Model de Luxe, 1 h.p., 3-speed, de Luxe Sidecar .. £84 18

JAMES, 1918, 5-6 h.p. twin, quite the latest ..... £84 0

ENFIELD, 1917, 2½ h.p., 2-speed, 2-stroke, 3 lamps, horn, etc. .... £44 2

HARLEY-DAVIDSON, 1917, magneto model, bulbs back H.-D. Sidecar £130 0

ROVER, 1918, 5-6 h.p. twin Combination £124 5

Or solo ..... £97 10

ROVER, 1917, 3½ h.p., 3-sp. countershaft Combination, with Sidecar; present price, £106/4/6; our price ..... £99 4/6

ROVER, 1916, 3½ h.p., solo model, lamps, and horn. Rare bargain ..... £68 10

ARIEL, 1917, 3½ h.p., 3-sp. Combination £93 10

LEVIS, 1917, 2½ h.p., 2-speed, Model "E" £47 10

LEVIS, Popular Model ..... £32 0

CALTHORPE-J.A.P., 1917, 2½ h.p., 2-sp., Enfield gear ..... £39 16

ALLDAYS ALLON from ..... £37 10

ROYAL RUBY, all models from ..... £32 10

## SECOND-HAND MACHINES.

ENFIELD, 1917, 3 h.p., speedometer, Lucas lamps, like new, only ridden 400 miles ..... £63 0

ENFIELD, 1916, 6 h.p. Combination, Lucas dynamo set, hood, screen .. £110 0

TRIUMPH, 1913, 3½ h.p., 3-sp., semi-T.T. bars ..... £32 10

TRIUMPH, 1914, 4 h.p., Sturmer-Archer gear, Sidecar, speedometer ..... £48 10

HARLEY-DAVIDSON, 1915, magneto model, with Sidecar ..... £72 10

HARLEY-DAVIDSON, 1915, magneto model, with Sidecar ..... £68 10

HARLEY-DAVIDSON, 1916, electric model, and H.-D. Sidecar, as new .. £89 10

HARLEY-DAVIDSON, 1915, electric model, and Sidecar ..... £75 0

SINGER, 1913, 4½ h.p., 2-speed, countershaft Combination, cane Sidecar, speedometer, lamps, horn ..... £35 0

ARIEL, 1915-16, 3½ h.p., countershaft Combination, kick-starter, speedometer, lamps, horn ..... £72 10

TORPEDO PRECISION, 2½ h.p., hand cl. £12 10

JAMES, 1913, 4½ h.p., solo, with access. £22 10

JAMES, 1916, No. 6 Combination, special silencer under Sidecar, speedometer, lamps, horn, and apron, quite as new £75 0

INDIAN Powerplus, 1916, 7-9 h.p., 3-sp. Comb., lamps, speedometer, horn, like new ..... 70 gns.

LEVIS Popular, 1916, sound, with access. £23 10

LEVIS, No. 1, 1914, 2½ h.p., single-speed, fine condition ..... £23 10

A.J.S., 1914, 6 h.p. Comb., 5 gn. speedometer, 3 lamps, horn, hood, screen £77 10

NEW HUDSON Comb., 3½ h.p., 3-speed £35 0

CONNAUGHT, 1916, 2½ h.p., s.-T.T. bars £22 10

ALLDAYS ALLON, 1915-16, single-speed, and accessories ..... £25 0

O.K.-JUNIOR, 1916, single-sp., 2-stroke £21 0

HAZLEWOOD-J.A.P., 5-6 h.p. twin, and Sidecar, hood, screen, speedometer £53 10

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## MOTOR CYCLES FOR SALE.

## B.S.A.

1915 B.S.A. Combination, 4½ h.p., 3-speed, chain driven, all accessories, splendid condition, carefully used, 2,000 mileage; £70.—Gill, Thorndon, Eps. Suffolk. [X7030]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—B.S.A., 1913, 3½ h.p., 2-speed, clutch, 26 gns.; another, similar, but requires slight attention, 19 gns. (D) [X347]

1916 B.S.A., 4½ h.p., chain-cum-belt, and Millford sidecar, just been overhauled, in good condition; £65.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [X552]

B.S.A., 3½ h.p., countershaft gears, kick start, heavy Dunlops, perfect condition, recently overhauled, all accessories and spares; for £29.—Young, 75, Victoria Rd., Stroud Green, N.4. [X151]

B.S.A., 4½ h.p., late 1915, all chain, 3-speed, coach-built sidecar, little used, excellent condition throughout, plating, enamel like new; £60.—G. H. Ashurst, Fyfield, Bognor. [X214]

B.S.A., 1914, countershaft 3-speed, all chain, No. 2 B.S.A. sidecar, and luggage grid, fitted with C.A.V. electric lamps, new Dunlops, in perfect condition; £60.—Wareing, 17, Larden Rd., Acton, W.3. [X6971]

B.S.A. 1916 4½ h.p. Coachbuilt Combination, 3 speeds, countershaft, clutch, kick start, chain and belt drive, fully equipped, and like new throughout; £59/10, absolute bargain.—The Mews, Victoria Rd., Clapham, S.W. [X952]

B.S.A., 4½ h.p., chain-cum-belt, Canelet combination, speedometer, lamps, horn, shield, spare belt, valve, balls, springs, spokes, plug, tube, tools, had most careful usage, excellent order and appearance; £65.—Wright, 2, Milton Rd., East Sheen, S.W. [X908]

B.S.A. Combination, 1916, 4½ h.p., B.S.A. countershaft 3-speed, 25x2½ Dunlop tyres, B.S.A. coachbuilt sidecar, hood, wind screen, luggage carrier, 3 lamps, horn, Stewart speedometer, mileage 2,711, condition equal to new; £70.—The Premier Motor Co., Aston Rd., Birmingham. [X131]

B.S.A. 3-speed, all chain model H, and coachbuilt sidecar, 1915, Binks carburettor, speedometer, 3 Lucas lamps, Glorophone, Pillion seat, luggage-petrol arid, tools, 3 new tyres, powerful dependable outfit, owner rider, bought new B.S.A. reason of disposal; £50 cash.—Letters only, Fleming, 19, Pawis Sq., Brighton. [X6936]

4½ h.p. B.S.A., 1915 model, 3-speed countershaft gear, kick starter, and free engine, £50, includes accessories; also a 1916 model 4½ h.p. B.S.A., fitted with an Empress Mills and Fulford sidecar, 3-speed, kick start, and free engine clutch, £65, accessories included, both machines carry our usual guarantee of mechanical fitness.—Wanchope's, 9, Shoe Lane, Fleet St., London. [X929]

LATE 1914 B.S.A., 3-speed, chain drive, and coach-built sidecar, with lockers, luggage grid, and apron, full set lamps, 2 generators, speedometer, horn, new inner tube in case, outer cover, mackintosh overalls, spare plugs, new valve and other spares, mileage 4,000 (80 m.p.g.), all in perfect condition; 50 gns. (less without accessories); Saturday, Sunday, or appointment.—12, Broomfield Rd., Surbiton Hill. [X176]

## Calthorpe.

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [X7099]

CALTHORPE, 1917 models in stock, 2 and 4-strokes. Write for lists.—Walsall Garage, Walsall. [X7038]

CALTHORPE-J.A.P., 2½ h.p., 1915, Enfield 2-speed; £21.—Macpherson, Llanwnda, Carmarvonshire. [X9095]

CALTHORPE, 2-stroke, 2-speed, 1915, condition perfect; £20.—G. P. Pattinson, Newton Hall, Moberley, Knutsford. [X6734]

CALTHORPE-J.A.P., 1915, 2½ h.p., Enfield 2-speed, unused last 12 months, overhauled, engine perfect; £23.—Paul, Drill Hall, Hertford. [X257]

LATE 1915 Calthorpe Junior, 2-speed, P. and H. lamps, new condition; £21; seen appointment.—Glen Helen, Chestnut Av., Langley Rd., Slough. [X185]

1917 4-5 h.p. Calthorpe-Jap, twin, 2-speed Enfield gear, chain drive, £65, cash; easy payments arranged.—Jones' Garage, Broadway, Muswell Hill, N.10. [X161]

CALTHORPE.—1917 models in stock at P. J. Evans, John Bright St., Birmingham, the Birmingham and Midland agent. Two-strokes, four-strokes, and 4-5 h.p. twin J.A.P. combination, also ladies' models. [X1947]

NEW 2½ h.p. Calthorpe-Japs, latest 1917 models, fitted with the very latest J.A.P. engine, Enfield 2-speed gear, £39/18; also single-speed models, new, £32; extended payments 2% only charged above these prices for the convenience.—Wanchope's, 9, Shoe Lane, London. [X9290]

## Campion.

CAMPION, 1916, 2½ h.p., 2-stroke, 2 speeds, mileage under 500; lowest £25.—Strong, 22, Park Rd., W.3. [X9042]

CAMPION 4½ h.p. Combination, Bosch, B. and B. good tyres, lamps, Grando pulley, running on paraffin, £25.—Trevethick, 18, Warwick St., Old London, Nottingham. [X7063]

1917 Campion, 8 h.p. J.A.P. engine, Jardine 4-speed gear box, kick-starter and clutch, speedometer, coachbuilt sidecar, indistinguishable from new; £85.—Percy and Co., 337, Euston Rd., London, N.W.1. [X9398]



## MOTOR CYCLES FOR SALE.

## Chater-Lea.

- CHATER-LEA** No. 7 1912 Combination, less unit: £16-98, Naylor Rd., Peckham, S.E. [9054]  
**CHATER-LEA**, 8hp., specially tuned engine, 3-speed, kick start, disc wheels, latest type short frame and gear box, Onkleigh sporting sidecar, finished red: £65-47, Peppys Rd., New Cross, S.E. [9345]

## Clyno.

- CLYNO** War Office Combinations for early delivery from Colmore Depots, Birmingham and Manchester. [0884]  
**CLYNO**, 1914, 3-speed, lamps, Stewart speedometer, fine condition; £40-65, Tooting Bec Rd., London, S.W. [9169]  
**CLYNO**, 1913-14, 5-6hp., sidecar, 2 new tyres and tubes, spare wheel, all accessories; £55 for quick sale.—Johnson, Florist, Chiswick, W. [9199]

- CLYNO**, 1913-1914, 5-6hp., twin-cyl., 2-speed, Bosch mag., kick starter, in good running order, with large Phoenix cake sidecar; £55.—W. Fowler, 70, Queen's Rd., Norwich. [X7004]

- CLYNO**, 1913-14, 5-6hp., 3-speed, and sidecar, P. and H. lamp set, Coway and horn, sidecar complete with spare wheel; £62; 1914-15, 3-speed, 5-6hp., and sidecar, £69; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7099]

- CLYNO** 1916 Coachbuilt Combination, 5-6hp. twin mag., 3 speeds, countershaft, speedometer, mechanical horn, Cape horn, fine lot; 75 gns.; exchanges, also easy terms quarter down.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). Phone: Battersea 327. [9206]

- CLYNO** Combination, 1914 twin-cyl. engine, detachable wheels, fitted with roomy family sidecar, 3-speed, kick starter, clutch, all chain drive transmission, £65; also another fitted with de luxe sidecar, hood, screens, detachable wheels, spare wheel and 112, with all accessories; £73/10; both carrying our guarantee of mechanical fitness.—Wanchope's, 9, Shoe Lane, Fleet St., London. [9291]

## Connaught.

- 1915** Connaught 2-stroke, in very good order; £18.—Percy and Co., 337, Euston Rd., London, N.W.1. [9386]

- CONNAUGHT**, 1916, 2½hp., 2-stroke, single speed, very little used, splendid condition; bargain, £25.—Ashdene, Brentwood Rd., Romford. [9220]

- CONNAUGHT**, 2½hp., semi T.T., new heavy Dunlop and belt, refurbished throughout, complete, runs on paraffin; £22-22, Arkwright St., Gainsborough, L. [X7060]

- CONNAUGHT**, 1916, 2-stroke, complete with head lamp, generator, rear lamp, horn, etc., only done small mileage; bargain, £26.—Advertiser, 156, Gt. Portland St., W.1 [8774]

- CONNAUGHT** Miniature, single speed, new, £33/17/6; ditto, 2-speed, £41/6/6; standard 2-speed, £44/9; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7101]

- CONNAUGHT**, 1916, 2-stroke, Albion 2-speed, fine head lamps, Lucas horn, Dunlops as new, insurance policy, really fine machine; £25.—Clay, Kingsleigh, Wellington, Salop. [X6972]

## Coventry Eagle.

- COVENTRY** Eagle, 2-speed, now; 42 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7100]

- 1916** Coventry Eagle, Triumph 2 speeds, 2-stroke, free engine, 2½hp., in nice condition, run 300 miles only; £36.—Percy and Co., 337, Euston Rd., London, N.W.1. [9387]

## Dalm.

- DALM**, 2-stroke, E.I.C. mag., P. and H. lamps, new tyres; no reasonable offer refused; must sell.—Lient. Ireland, Castle Hill Lodge, Church Rd., Upper Norwood. [9135]

## Douglas.

- 1915** Douglas, 2½hp., 2-speed, almost new; £42.

- 1915** Douglas, 2-speed, 2½hp., in exceptional nice condition; £44.

- 1915** Douglas, 2½hp., 2-speed, in very nice condition; £46.

- 1911** Douglas, single-speed, in very nice order; £17/10.—Percy and Co., 337, Euston Rd., London, N.W.1. [9389]

- DOUGLAS**, 2½hp., 2-speed, 1914 model; £30.—Baker and Sons, 35, Friar St., Reading. [X7081]

- DOUGLAS**—Prompt delivery to those on work of national importance.—Gibb, Oloucester. [4749]

- DOUGLAS**, 2½hp., 2-speed, equal new; £30.—Flying Officer, 100, High Rd., New Southgate. [X6737]

- 1914** Douglas, 2-speed, splendid condition; bargain, £32/10.—Fribbins, 70, Pine Rd., Crickwood. [9198]

- 1910** Douglas, 3½hp., overhauled, tip-top condition; £15.—A.M.E. Co., 1, Eltham Rd., Lea Green 707. [9141]

- DOUGLAS**, 1914 T.T., 2½hp., 2 speeds, fine condition; many others.—Griffin's, 89, Gt. Portland St., W.1. [8933]

- DOUGLAS**; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel: 50. [5855]

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## MOTOR CYCLES FOR SALE.

## Douglas.

- 1916** Colonial Douglas, clutch, 3-speed, K.S., accessories, spares; £48; must sell.—Box 1,553, c/o The Motor Cycle. [X7066]

- RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Douglas, 1914, 2-speed, 34 gns.; 1915, 3-speed, 37 gns. [J] [9350]

- DOUGLAS**, 2-speed, sound condition and appearance, wants tuning; gift, £16-1, Brunet Place, Eccles, near Bedford. [X6894]

- COLMORE** Depots, Birmingham, Manchester, and Liverpool, and Leicester, for earliest delivery of Douglas motor cycles. [0800]

- DOUGLAS**, 1912, 2-speed, clutch, kick start, Amco, tyres almost new, splendid condition; £24-29, Wymond St., Putney. [X7046]

- 2½hp.** Douglas, Druids, spring forks, new tyres and 24 belt, in good running order; £12/10-67, Mane-field Rd., Walthamstow. [9279]

- DOUGLAS**, 4hp., 2-speed, kick start, C.B. sidecar, perfect; £70-W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8913]

- DOUGLAS**, 1915, complete with all accessories, little used, in perfect order; £45.—Telford Garage, 47, Streatham Hill, S.W.2. [9145]

- DOUGLAS**, 1915, 2-speed, excellent condition, all accessories; nearest £39.—Lt. Thomas, c/o Central Garage, Lord St., Southport. [X7049]

- THREE** 2½hp. Douglas Motor Cycles, from 30 gns.; 2-speed gear models, 1913-14 and 1915.—Wanchope's, 9, Shoe Lane, Fleet St., London. [9299]

- 1914** Douglas, 2½hp., 2-speed, T.T., and accessories, in good condition; £32; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [9313]

- 1914** T.T. Douglas, 2-speed, extra fast one, long, large exhaust pipe, magnificent condition throughout, lamps, tools; sacrifice £36/10.—Else, Dimple, Matlock. [X7013]

- DOUGLAS**, 1916, 2½hp., T.T., 2-speed, Lucas lamps, horn, speedometer, tools, perfect condition; bargain, £45.—Leggett, 306, Fulham Rd., Kensington. [9124]

- DOUGLAS**, 2½hp., 1914, 2-speed, T.T. bars, good tyres, head lamp, generator, very nice condition throughout; £32/10.—Advertiser, 156, Gt. Portland St., W.1. [9326]

- TWO** Year Old Douglas V, 2-speed, well equipped with spares, and accessories, and well cared for; £40; machine alone £35.—A. Stringer, 40, Bishop St., Coventry. [X7016]

- 1916** 4hp. Douglas Combination, 3-speed, condition as new, fully equipped, guaranteed; £75.—Well-boy Motor Garage, Woodford Rd., Forest Gate. Phone: Stratford 309. [9264]

- 2½hp.** Model W Douglas, 3-speed, clutch, kick start, purchased new 2 months ago, been few miles only, really new, in perfect order; £58.—Robinson's Garage, Green St., Cambridge. [9115]

- DOUGLAS** Motor Cycles.—We can deliver 1917 Model W on receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol. (Wholesale and retail.) [9023]

- 1914½** Douglas, 2½hp., T.T., 2-speed, new Dunlop (heavy) tyres, long exhaust pipe, fast, powerful, splendid condition, fully equipped; £34/10-14, Cyprus St., Globe Rd., Old Ford Rd., N.E. [9344]

- DOUGLAS**, 1915, purchased new July this year, all black W.D. model, 2½hp., 2-speed, ridden not more than 300 miles, in every way equal to new; £50.—Leather, 26, High St., Wandsworth. [X6910]

- 1915** 2½hp. Douglas, 2-speed, fitted with lamps, speedometer, mechanical horn, pump, tools, etc., very fast mount, guaranteed perfect; £45.—Wellboy Motor Garage, Woodford Rd., Forest Gate. [9265]

- DOUGLAS**, 2½hp., late 1915, 2-speed, T.T. bars, new Lucas lamps, mechanical horn, Pedley grips, knee pads, tyres perfect, just overhauled, and in perfect condition, complete tool kit; £46.—H. Newsome, Belvedere Rd., Coventry. [X6938]

- DOUGLAS**, 1915, 2½hp., 2-speed, Colonial Model, semi T.T. bars, P. and H. head lamp, Stewart speedometer, Junior long horn, long exhaust, done 55 on the track, just overhauled; £45; Surrey.—Box 14,874, c/o The Motor Cycle. [9074]

- DOUGLAS** Motor, running order, £13; folding S.O. chassis, spring wheel £2; Motococche, complete, less battery, £4/10; two 700x80 covers and tubes 30/-; Druids, 5½, £2; Miller lamp set, 15/-; stamped replies.—Motors, 12, Albion Gardens, Hammersmith. [9230]

- 2½hp.** Douglas, absolutely new; immediate delivery of 24 models U, V, and W, clutch, kick-start, against priority permits, for doctors, farmers, war and munition workers. How and where to apply.—For full particulars, write to the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [9114]

## Edmund.

- EDMUNDS** (new), 2½hp. J.A.P. Royal Enfield 2-speed, spring frame, double tank, strongly-built machine; £54/12/6; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods Stores, Ltd., Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9341]



## MOTOR CYCLES FOR SALE.

## Elswick.

24 h.p. Elswick (1914), 2-stroke, 2-speed, perfect condition; £22-129, High St., Croydon. [X7083]

## Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2½ h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [06838]

1917 Enfield Combination, as new, spares complete; £90.—Stacey 12, Ecclesall Rd., Sheffield. [9254]

ENFIELD Motor Cycles.—Prompt delivery all models.—P. J. Evans, John Bright St., Birmingham. [9148]

ENFIELD 1914 Twin, new condition, chain drive, kick, lamps; £27.—229, Maryvale Rd., Bournville. [X6729]

1916 Enfield 6h.p. Combination, perfect condition, little used; £85.—Tuckey, Stow-on-the-Wold, Glos. [X6937]

ENFIELD, 2½ h.p., 2 speeds, excellent condition, many others.—Griffin's, 89, Gt. Portland St., W.I. [8934]

24 h.p. 2-stroke 1916 Royal Enfield, perfect condition; any trial; £32.—Hatcher, 53, Popes Av., Twickenham. [9045]

ENFIELD, 2½ h.p., 1912, perfect order, complete, stored 2 years; £16.—22, Arkwright St., Guinborough. (D) [X7061]

1914 6h.p. Enfield Combination, done about 5,000 miles only, in perfect order; £65.—Missin, Cottingham, Hull. [X7010]

ENFIELD 1915 Combination, 6h.p., 2-speed, lamps, horn, and usual accessories, in splendid condition; £72.—Hawkes, The Ladywell, Ladywell, S.E.13. [X7047]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead—Enfield, 1916, coach combination 79 gns.; 1916 2-stroke Enfield, 2-speed, 27 gns. (D) [9351]

1915 Enfield Combination, every accessory, new condition, very low mileage, £58, or close offer for cash.—436, Whitehorse Rd., Thornton Heath. [9192]

1917 3h.p. Enfield Combination, fitted with electric light, not done 500 miles, as new; 50 gns., bargain.—Wellboy Motor Garage, Woodford Rd., Forest Gate. [9266]

ENFIELD 1917 8h.p. Dynamo Combination, screen, speedometer, tyres 700×80, 3 spare tubes, 2 spare chains; £90.—Jordan, 73, Horace St., St. Helens, Lancs. [X6964]

ENFIELD Combination, 1916, Lucas dynamo lighting, screen, hood, speedometer, etc., a beautiful turnout; £85, cheap.—51, Maplethorpe Rd., Thornton Heath, S.E. [9231]

ENFIELD Lightweight, 2½ h.p. twin, Bosch mag., Amec carburetter; £15, quick sale; plating and enamelling as new, khaki finish.—Lindfield, High St., Crawley, Sussex. [9086]

ENFIELD, 6h.p., late 1914, 2-speed, handle starter, good tyres, coachbuilt sidecar, head lamp, generator, rear lamp, fully equipped, and perfect throughout; bargain, £45.—Below.

ENFIELD, 2½ h.p., 1914, 2-speed, kick starter, all chain drive, Enfield grey, good tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout; bargain, £32/10.—Mebs and Mebs, 156, Gt. Portland St., W.I. [7261]

1916 Enfield Combination, 6h.p., Lucas dynamo lighting, horn, mirror, hood, screen, very fine outfit; £105.—Eice and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481]

6h.p. Royal Enfield Coachbuilt Combination, speedometer, lamps, luggage grid, new November, 1915; £78, or near offer.—7, Grove Terrace, Burton Rd., Widdington, Manchester. [X7015]

ENFIELD (Sept., 1914) Combination, splendid condition, lately overhauled, fitted with lamps, spare tank, Morgan vaporiser; £55, or offer.—31, Douglas Rd., Acoc's Green, Birmingham. [X6741]

1917 Model 6h.p. Enfield Combination, bought end of 1916, Cowey speedometer, Lucas horn, acetylene and electric lamps, wind screen, luggage grid, in perfect order; £88, no offers.—Rector, Great Warley, Essex. [9051]

ROYAL Enfield Combination, 1913 model, £55; 1914 combination, £65; 1915 combination, £75; 1916 combination, 80 gns., including hood and screen; all these machines are guaranteed.—Wauchope's, 9, Shoe Lane, London. [9300]

ENFIELD 6h.p. 1916 Combination, Palmer cord light car tyres all round, large head lamp, generator, rear lamp, luggage carrier to sidecar, very nice condition throughout, and fully equipped; £82/10.—Advertiser, 156, Gt. Portland St., W.I. [7904]

ENFIELD 1915 Combination, 6h.p., 2-speed, clutch, Thompson-Bennett mag., Amec carburetter, fitted with lamps, Stewart speedometer, and horn, £67/10; 2½ h.p. 2-speed, £20; E.P. or exchange.—Service Co., 292, High Holborn, London. [X7102]

6h.p. 1916 Enfield Combination, Lucas dynamo lighting, 2-seated sidecar, 700×80 Palmer cord tyres all wheels, Enfield spring handle-bars, lovely outfit as new, only used on Sundays occasionally; £100; seen any time.—Moulton, 68, Lawrence Rd., Wavertree, Liverpool. [X6911]

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## MOTOR CYCLES FOR SALE.

## Enfield.

ENFIELD, 3h.p., late 1914, T.T. Model, with round ster mudguards and handle-bars, tyres almost new, Roman rims and rustless spokes, just been overhauled, everything in first-class condition, 150 m.p.g., has been carefully used and well looked after; £36.—Box 1, 299, clo The Motor Cycle. [X6359]

TWIN Enfield, 1916, 3h.p., with Canoelet sporting sidecar, and complete with lamps, horn, sidcar apron, and tools, in splendid condition and appearance almost like new; £55; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9342]

ENFIELD 1916-17 6h.p. Dynamo Combination, hood, screen, speedometer, 105 gns.; also 1916 ditto, £105; also 1916 standard model, sold new May, 1917, with hood, screen, speedometer, quite like new, ridden only 3,500 miles, £115; also 1917 3h.p. solo, with 6 g.n. speedometer, Lucas lamps, horn, £63; also 1917 2½ h.p. 2-speed model, £44/2; easy payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9155]

## Excelsior.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead—Excelsior, British, 1914, 5h.p. bir-single, countershaft gears; 36 gns. (D) [9366]

EXCELSIOR (English), big single, 6h.p., 1914, Binks carburetter, all sound, and in splendid running order, coachbuilt sidecar, and all accessories; £50.—St. Edmund Garage, Northampton. [X7020]

AMERICAN Excelsior, dynamo lighting, speedometer, Canoelet sidecar, hood, screen, done 100 miles only; sacrifice £30, or exchange player-piano.—Palmer, Room 222, Imperial Hotel, St. Annes-on-Sea. [X6939]

AMERICAN Excelsior, Standard Model, new in February, 1917, not done 2,000 miles, 7h.p., 3 speeds, Bosch mag., 5 lamps, mechanical horn, spring frame Montgomery sidecar; we have taken down engine, cleaned out carbon, ground in valves, and guarantee this machine mechanically as new; £75 cash only.—The Premier Motor Co., Aston Rd., Birmingham. [9129]

AMERICAN Excelsior, new 1917 Model de Luxe, the last word in sidecar machines, 7h.p., 3-speed, automatic carburetter, mechanical force feed lubrication, 28×3 tyres, front and rear springing, etc., £85; or complete with special Lounge type sidecar to match, £105; only a few machines left; every machine specially adjusted and tuned; delivered free.—The Premier Motor Co., Aston Rd., Birmingham. [9128]

## F.N.

F.N., 5-6h.p., new gears and tyre, fully equipped; offers.—White, Fern Villa, Woodham Ferris, Chelmsford. [9200]

F.N., 4-cyl., 6h.p., 1913, in perfect order, excellent cane sidecar; price £35.—Rev. Courtman, East Henningfield, Chelmsford. [9094]

## Harley-Davidson.

1916 Model F Harley-Davidson, as above; £95.—Stacey, 12, Ecclesall Rd., Sheffield. [9253]

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for Harley-Davidsons. [0802]

HARLEY-DAVIDSON 1915 Combination, 3-speed, electric, fine condition; £70.—241a, Lord St., Southport. [X7050]

HARLEY-DAVIDSON Combination, 1915, good mechanical order, enamel moderate, mechanical horn; £62/10.—47, Newland Av., Hull. [X7055]

HARLEY-DAVIDSON Combination, 1916 model, Bosch mag., including accessories; £75.—Wauchope's, 9, Shoe Lane, London. [9301]

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for Harley-Davidsons; P. and H. lamp sets, specially made for H.D., £5/5, carriage paid. [9256]

1915 Model J. Harley Davidson, Empress sidecar with screen, in absolutely perfect condition; £67/10.—Stacey, 12, Ecclesall Rd., Sheffield. [9255]

HARLEY-DAVIDSON, 1915, electric equipment, Swan sidecar, with hood and screen, in excellent condition; £70.—11, Bancroft Rd., Mile End, E. [9121]

HARLEY-DAVIDSON Combination, late 1916, mag. model, disc wheel sidecar, everything perfect; £80, no offers.—Beswick, 1, West Heath Av., Golders Green. [9167]

PRACTICALLY New 1916 7.9h.p. Harley-Davidson sporting solo mount, disc wheels, semi T.T. bars, full accessories; £75.—Box L4, 882, clo The Motor Cycle. [9111]

HARLEY-DAVIDSON, 1916, fitted with Phoenix 2-seater sidecar, in splendid condition; 80 gns.—Collins, 11, Colas Mews, Birchington Rd., Kilburn N.W.6. [9172]

HARLEY-DAVIDSON, 1915, all electric model, Gloria sidecar, Palmer cords nearly new; £60 cash.—Mayes, Silverlea, Farnborough Rd., Farnborough, Hants. [9159]

HARLEY-DAVIDSON Combination, late 1915 model, hood, screen, all lamps, Bosch mag.; bargain. £75.—Davies, Zoar St., Lower Gornal, near Dudley. [X7040]

HARLEY-DAVIDSON, 1916, electrical model, and sidecar, Stewart speedometer, pillow seat, perfect condition, 1,000 miles; £83, no offers.—45, Upper Tooting Rd., S.W. [9204]



## MOTOR CYCLES FOR SALE.

## Harley-Davidson.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—T.T. Harley, 7-9h.p., 3-speed, clutch, kick start, dynamo lighting, disc wheels, khaki finish as new; 65 gns. (D) [9352]

**1916 Harley-Davidson**, Model J, electric model, with M.F. Empress chassis and Cooper de luxe body; cost £125 three months ago, condition as new; £100.—Storey, -2, Ecclesall Rd., Sheffield. [9327]

**HARLEY-DAVIDSON**, 1917 electric model, bought new end May, owner driven, speedometer, 2-seater sidecar, 2 screens triple, 2 aprons, electric sidecar lamp, nearly new motor suit, quantity petrol; £135.—Box 14,886, c/o *The Motor Cycle*. [9327]

**HARLEY-DAVIDSON**, 1917, nearly new, hood and screen, electric lighting, all new tyres, all spares £130; also Harley-Davidson, 1916, electric lighting speedometer £80; both combinations are in perfect condition.—Hobden, Silver St., Salisbury. [X7021]

**HARLEY-DAVIDSON**, 1917 mag. model, with C. bulbous back sidecar, hood, screen, £130; also two 1915 mag. combinations, £62/10 and £72/10; also 1915 electric combination, £75; also 1916 electric combination, with genuine H.D. sidecar, £89/10; exchanges, easy payments.—Lamb's, 151, High St., Walthamstow and 50, High Rd., Wood Green, N. [9151]

## Hazlewood.

**HAZLEWOOD** 1915 Combination, 5-6h.p. J.A.P. engine, 3-speed clutch, and kick starter, Lucas lamps, speedometer, special sidecar; £72/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7103]

## Henderson.

**HENDERSON**, 10h.p., 4-cyl., coachbuilt sidecar, machine is in damaged condition; £25 the whole combination.—Baker and Sons, 35, Friar St., Reading. [X7030]

## Humber.

**HUMBER** Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

**HUMBER**, new 3½h.p., latest flat twin, 3-speed war model, actually in stock.—Moss, Wom. [X6976]

**1914 3½h.p.** 3-speed Humber, lamp, etc.; £35, cusi or easy terms.—E. E. Jones (Garages), Ltd., Swan sea. [0863]

**HUMBER**, 3½h.p., 2-speed, clutch, kick start, perfect; £32.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8914]

**HUMBER**, with sidecar, 3½h.p., mag., 2 speeds; girl, £16/16.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [9207]

**1914 3½h.p.** 3-speed Humber Motor Cycle, and Mill ford sidecar, 3 lamps, and accessories; £40; perfect condition.—18, Lumley Rd., Skegness. [9085]

**HUMBER**, 3½h.p., handle starting, Roe gear, auxiliary tank (runs on paraffin), lamps, tools, all accessories, perfect order; bargain; £22/10.—Barley, 64a, Highbury Grove, London, N.5. [9217]

**HUMBER**, 1916 6h.p. twin combination, practically new head, tail, and sidecar lamps, driving mirror, Stewart speedometer, Lucas 63 and Stewart warning signal, watch, hood, screen, full tool kit, 650x65 extra heavy Danlops: owner called up; what offers?—Box 14,881, c/o *The Motor Cycle*. [9110]

## Indian.

**T.T. Indian**, 1915, 5h.p., 3-speed; £40.—Somerford Nicholas Rd., Blundellsands. [X6901]

**INDIAN**, 1914, 7-9h.p., and sidecar, wire wheels, all accessories, excellent condition.—Christie Bros., St. Andrews. [9109]

**1915 Indian**, 5-6h.p., 3 speeds, Phoenix sporty C.B. sidecar, lamps, etc.; £54.—S.F., 2, Russell St., Brixton. [9186]

**7-9h.p. Indian** 1914 Combination, fitted with De Luxe sidecar, and all accessories; £47/10.—Wauchope's, 9, Shoe Lane, London. [9302]

**INDIAN**, late 1915, 7-9h.p., T.T. clutch model, new condition, property of an officer; £45.—Eagles and Co., High St., Acton, W.3. [X7074]

**1915 Indian**, 5h.p., 3-speed, only ran 500 miles, like new, speedometer; 50 gns.—Percy and Co., 337, Euston Rd., London, N.W.1. [9378]

**INDIAN**, 1915, 5h.p., and sidecar, 3-speed, electric light, speedometer, tyres new; trial; £48.—26, Warrender Rd., Tufnell Park, N.19. [9064]

**INDIAN**, 7-9h.p., in splendid order, complete with lamps and tools, etc.; £25, or would exchange.—Advertiser, 5, The Crest, Hendon, N.W.4. [9258]

**1915 Indian**, 3-speed, twin, lamps, horn, spares, kick start, only 6 months wear; £45, or nearest offer.—Dr. Stewart, 52, Wood St., High Barnet, Herts. [X6907]

**LATE 1915 Indian**, 7-9h.p., 3-speed, kick start, Indian de luxe sidecar, only ridden 1,000 miles; offers; seen any time—785, High Rd., Leytonstone. [9280]

**INDIAN**, 1915 (Nov.), 7-9h.p., clutch model, brand new condition, mileage under 700, faultless; £50; exchange considered.—Gidea Farm, Little Clacton, Essex. [X7121]

**INDIAN** 7-9h.p. 2-speed Combination, horn, lamps, sidecar, good running order; owner overseas; price £38, or close offer.—Calf and Co., Motor Garage, Broadway, Wimbledon. [9222]

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## MOTOR CYCLES FOR SALE.

## Indian.

**POWERPLUS** 1916 7-9h.p. Indian Combination, practically new, condition unscratched; exceptional opportunity to secure the very best; £85.—Telford Garage, 47, Streatham Hill, S.W.2. [9146]

**RED Indian**, T.T. bars, 3-speed, clutch, kick start, specially fast, latest model, 5-6h.p. twin, only done a few miles, absolutely as new; £60, or very near offer.—Box 1,351, c/o *The Motor Cycle*. [X7025]

**1914 7-9h.p. Indian** Combination, small mileage, perfect condition, new tyres, many spares, and everything necessary to run machine, 1,500 miles; £48.—Wheale, 8, Gloucester Rd., Bishopston, Bristol. [9097]

**INDIAN** Powerplus 1916 7-9h.p. 3-speed Combination, 75 gns., rare bargain; actually in stock; condition perfect, lamps, horn, speedometer.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9156]

**INDIAN**, blue, 1912-13, 7-9h.p., clutch, free engine, and coachbuilt sidecar, P.H. lamp, horn, etc., splendid condition; trial; £35; exchange 4½h.p. cash adjustment either way.—Scase, 18, Lyndhurst Rd., Edmonton. [9062]

**INDIAN**, 1916, 5h.p., 3-speed, kick start, perfect condition throughout, ridden approximately 2,500 miles, special mudguards, extra tank for running on paraffin mixture; £55.—7, St. John's Park, Blackheath, S.E.3. [9224]

**1916 Powerplus Indian**, 7-9h.p., 3-speed, K.S. spring frame, electrically equipped, lovely special sidecar, hood, screen, heaps spares, like new, petrol, super tarmac; smaller machine part; £84.—Box 1,354, c/o *The Motor Cycle*. [X7067]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Indian, 1916, 2-stroke, 3-speed, clutch, kick start, 37 gns.; 1915 T.T. 7-9h.p. clutch Indian, 37 gns.; 1916 Powerplus 8h.p. 3-speed Indian, with sporting coach sidecar, disc wheel, 82 gns. (D) [9355]

## Invicta.

**INVICTA** (new), 3½h.p., Abingdon King Dick engine, Sturmer-Archer 3-speed countershaft gear, clutch and kick starter, Dunlop tyres, Brampton forks, a very fine machine; £65/2; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9343]

## Ivy.

**IVY**, 2½h.p., 2-stroke, single speed, excellent condition throughout; £25/5; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7104]

## Ixon.

**IXION**, 2½h.p., late 1915, P. and H. lamp set, in magnificent condition throughout; bargain, £20.—Watson, High St., Aldeburgh, Suffolk. [X7005]

## James.

**COLMORE** Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803]

**JAMES** 4½h.p. Coachbuilt Combination, 3-speed, 1915, very little used; £46.—Cpl. Abraham, Horse Guards, Whitehall. [X7079]

**2½h.p.** 1915-16 James, 2-stroke, 2 speeds, accessories, very little wear, splendid condition, good tyres; bargain, £25.—7, Herndon Rd., Wandsworth, S.W. [9059]

**JAMES**, 3½h.p., twin, 3-speed countershaft, clutch, h.b. controls, all accessories, perfect; £47.—W and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9319]

**JAMES**, 1915-16, 3½h.p., 3-speed countershaft, chain drive, kick start, in splendid mechanical condition; great bargain, £35.—Walsall Garage, Walsall. [X7034]

**JAMES** 1913 Combination, 3 speeds, kick starter, valve, clutch, chain drive, head lamp, generator, spare valves, unused less 12 months; £38.—James, 4, York St., Sutton-in-Ashfield, Notts. [9046]

**JAMES** and Sidecar, 1915, 4½h.p., Lucas dynamo lighting, Stewart speedometer, lamps, etc.; £78; 5-6h.p. twin, 3-speed, countershaft, 80 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [X7096]

**JAMES**, the latest 1918 5-6h.p. twin, actually in stock; also 1913 4½h.p. solo model, £22/10, with accessories; also 1916 No. 6 combination, with special sidecar under sidecar, speedometer, lamps, and horn, £75, like new.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9153]

## J.A.P.

**4 h.p. J.A.P.**, Chater 2-speed, powerful; bargain, £18.—53, Brownhill Rd., Catford. [9228]

## J.E.S.

**J.E.S. Auxiliary**, 600 miles, as new, all fittings complete, without bike; £8.—Munce, 2, Upper Mallow St., Limerick. [X7007]

## J.H.

**J.H.**, 2-speed, new; £35/14; extended payments or exchanges.—Service Co., 292, High Holborn, London. [X7105]

**J.H.**, 1917, brand new, 2½h.p., 2-speed, 2-stroke, countershaft; 42 gns.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8919]



## MOTOR CYCLES FOR SALE.

## Kerry.

31 h.p. Kerry Motor Cycle, fitted with Gradua gear, 32 good tyres, £26/10; also sidecar, wicker, £3/10. —50, Bolls Pond Rd., Islington, N.1. [9238]

## Lea-Francis.

1914-15 Lea-Francis, very little used, in excellent condition, with Stewart speedometer, Lucas head and rear lamps and horn; £45.—Pike, Southgate Barnstable. [9316]

## Levis.

1916 Baby Levis, 2½ h.p., T.T. handle-bars, in very nice condition; £24. [9379]

1916 Levis, 2-speed, 2-stroke, in real good order; £26.—Percy and Co., 337, Euston Rd., London, N.W.1. [9379]

LEVIS, new Popular and Model E machines actually in stock.—Moss, Wem. [X6977]

LEVIS, 2-speed, 1916; seen and tried here by appointment.—481, Kingston Rd., Wimbledon. [9126]

COLMORE Depots, Birmingham and Leicester, for delivery of Levis motor cycles from stock. [0804]

2½ h.p. 1916 Popular Model Levis, almost like new; £24 £25; guaranteed.—Wanchope's, 9, Shoe Lane, London. [9296]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Levis 1916 Popular, 22 gns.; Levis 1915 De Luxe, 2-speed, 26 gns. (D) [9354]

LEVIS 1915 Popular, engine thoroughly overhauled, 2 brakes, Lucas lamp and generator, tools; £19. L.M., 35, Bramblebury Rd., Plumstead. [9133]

FOR Sale or exchange, a Baby Levis, in good running condition; 20 gns.; a very good machine.—A. Wilson, Bramboro' View, Donisthorpe, Ashby-de-la-Zouch. [9134]

LEVIS, 2½ h.p., No. 1 Model, 2-speed, chain-cum-belt drive, rubber studded tyres, brand new, in stock for immediate delivery; reduced price £44.—Mehes and Mehes, 156, Gt. Portland St., W.1. [7564]

LEVIS, 1915, 2½ h.p., engine overhauled by makers May, rebushed, new crankshaft, flywheel rebored and refitted without key, original tyres, and generally excellent condition; £21/15.—Longhurst, Victoria Villa, Ascot. [9212]

## Lincoln-Elk.

1914 Lincoln-Elk and sidecar, 4½ h.p., 2-speed countershaft, kick start, new B. and B., nearly new tyres, splendid order; £30.—Jones, Beech Cottage, Clifton, Manchester. [9103]

## Matchless.

MATCHLESS Motor Cycles from stock at Colmore Depots, Birmingham and Manchester. [0881]

MATCHLESS J.A.P., 8-10 h.p., C.B. sidecar, 2 speeds, kick starter, perfect order; £45.—Piercy, 255, High St., Hounslow. [X7000]

MATCHLESS 5 h.p. Twin, J.A.P., free engine, in very nice order; £28.—Percy and Co., 337, Euston Rd., London, N.W.1. [9380]

NEW 7.9 h.p. War Office Matchless Combination, actually in stock; £120.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0480]

1917 Matchless Combination, brand new M.A.G. engine, 4 detachable wheels, Palmer tyres; £125; exchange entertained.—Soans, Dunn, and Jones, Bromley, Kent. Tel.: Bromley 350. [X6930]

1917 Matchless Combination, brand new, 4 detachable wheels, J.A.P. engine, war model, grand outfit; £120; exchange entertained.—Soans, Dunn, and Jones, Bromley, Kent. Tel.: Bromley 350. [X6931]

MATCHLESS 1917 Combination, 8 h.p., 3-speed, clutch, and kick starter, detachable wheels, including spare wheel, new; £120; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7106]

MATCHLESS (two) 1917 8 h.p. J.A.P. Combinations actually here, £120 and £125 respectively, spare wheels in both outfits; easy payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9152]

## Motocacoche.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Motocacoche, 1915, 3½ h.p. twin, M.A.G., Enfield gears; 48 gns. (D) [9349]

## New Hudson.

NEW Hudson, 1914, 6 h.p., 3-speed sidecar combination, very fine condition; £59/10.—Motor Exchange, Horton St., Halifax [9246]

NEW HUDSON, 2½ h.p. J.A.P. engine, 2 new tyres, in very nice running order; £16.—Percy and Co., 337, Euston Rd., London, N.W.1. [9390]

NEW Hudson 6 h.p. Twin, 3-speed, coach sidecar, all accessories; £60; perfect.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8915]

1914 4 h.p. New Hudson Combination, 2-speed, clutch, lamps, horn, spares, 2 new tyres, just overhauled; £40.—Walker, Blake Hall, Ongar. [9027]

1912 New Hudson, 3 speeds, clutch, lamps, horn, tools, lately enamelled and plated; £25.—Baber, 11, Raglan St., Risca, near Newport, Mon. [X7029]

NEW Hudson 1915 6 h.p. Twin Combination, very little used, perfect condition, large number spares; only trial; £75.—Monk, Gunmaker, Chester. [X6962]



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## MOTOR CYCLES FOR SALE.

## New Hudson.

1915 New Hudson, 2½ h.p., 2-speed, free engine, 2-stroke, fully equipped, perfect; 20 gns.—Well-boy Motor Garage, Woodford Rd., Forest Gate. [9267]

1914 3½ h.p. New Hudson, Armstrong 3-speed, perfect condition, very little used, also sidecar; £35.—Jeffery, 12, Norma Rd., Waterloo, Liverpool. [X6948]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 New Hudson coachbuilt combination, 3-speed, hood, etc., in fine order; 37 gns. (D) [9361]

NEW HUDSON, 4 h.p., late 1914 model, 3-speed, kick start, chain-cum-belt drive, in top-hole condition; great bargain, £34.—Walsall Garage, Walsall. [X7035]

NEW Hudson, 1913, 3½ h.p., 3-speed, clutch, in good running order; £34/15; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7107]

NEW Hudson, 1913, 3½ h.p., 3 speeds, clutch, wicker sidecar, side entrance, lamps, horn, spares, in perfect order; £28, or near offer.—Ferndale, Albert Park Rd., Malvern. [9056]

6 h.p. 1916 New Hudson, countershaft 3-speed model, clutch and kick starter, fitted with handsome coachbuilt sidecar, smart turn-out, ready for the road; 70 gns.; guaranteed.—Wanchope's, 9, Shoe Lane, London. [9297]

## New Imperial.

NEW Imperial, 1917, 2½ h.p., 3½ h.p., 6 h.p. models in stock.—Crown Bros., Guildford. [2563]

1915 Imperial-Jap, 2 speeds, lamps, horn; £23, or nearest.—21, Findern St., Derby. [X7056]

NEW IMPERIAL, 1916, 2½ h.p., 2 speeds, lamps, little used; £26, or near.—Stratton, Mt. Pleasant, Redditch. [9306]

NEW Imperial, 1916, 2½ h.p., 2 speeds, lamps, speedometer, many others.—Griffin's, 89, Gt. Portland St., W.1. [8935]

NEW Imperial-Jap, 1915, good order, Dunlop tyres and belt, nearly new; £25.—J. Tillier, 19, Market Place, Wokingham. [X7072]

1915 New Imperial, 2½ h.p. J.A.P. engine, in first-class order; £24.—Percy and Co., 337, Euston Rd., London, N.W.1. [9376]

NEW Imperial-Jap, 1916, 2½ h.p., 2-speed, kick start, perfect; £44.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8920]

1917 Brand New 8 h.p. New Imperial, War Office Model, and coach sidecar; 109 gns.—Motor Exchange, Horton St., Halifax. [9245]

## MOTOR CYCLES FOR SALE.

## New Imperial.

NEW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0839]

IMPERIAL J.A.P., 1915, complete except power unit, 2-speed gear, but top speed damaged; cash offers.—F., 86, Queen's Rd., Aldershot. [9321]

NEW Imperial-Jap, 2½ h.p., 2-speed, clutch, kick start, Stewart speedometer, horn, E.I.C., Samspar, open frame; £33.—Russell All Saint's Vicarage, Tooting. [X7070]

1917 New Imperial-Jap, 2½ h.p., 2 speeds, vaporiser, petrol and oil, 6 gallons, as new, mileage 800; a gift, £30, no offers.—Richardson, Kila Bank, Milnrow. [X6970]

2½ h.p. 1917 New Imperial-Jap, only run 200 miles, 2 2-speed gear, kick start, and h.b.c. clutch, includes all accessories; 40 gns.; guaranteed.—Wanchope's, 9, Shoe Lane, London. [9298]

NEW Imperials, 1917 models in stock; 2½ h.p. model, J.A.P. engine, 2 speeds, 39 gns.; also clutch models with kick starters, one shop-soiled 2-speed model, 36 gns.—P. J. Evans, John Bright St., Birmingham. [9149]

NEW Imperial-Jap, 2½ h.p., 2-speed, 1915, new condition, not done 1,000 miles, patent horn, Jones speedometer, tools, spares, and new outer cover; seen Thursdays or Sundays; £28.—Dupree, 14, Dangan Rd., Wanstead, Essex. [9060]

NEW Imperial (new) 2½ h.p., 2-speed; £40/19; actually in stock for immediate delivery; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9338]

NEW Imperial 8 h.p. J.A.P. Overseas War Office Combinations, as described in detail pages 252-3, Sep. 13th issue of this paper, exceptional machine in every detail; immediate delivery from stock; £114/9.—Colmore Depot, Distributors, Deansgate, Manchester, and 51, Renshaw St., Liverpool. [0886]

## Norton.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Norton, 1916 T.T., as new; 47 gns. (D) [9355]

1916 T.T. Norton, 3½ h.p., horn, and speedometer, very fast machine; £45.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0479]

NORTON Big Four, 3-speed countershaft, de Luxe sidecar, in exceptional nice condition; £70.—Percy and Co., 337, Euston Rd., London, N.W.1. [9381]

CROW Bros., Guildford, have another very fine 1916 T.T. Norton, Philipson, Lucas lamp, rear lamp, horn, very fast machine, in perfect tune; 50 gns. [9233]

NORTON, 1914, B.R.S., engine overhauled by makers July last, costing £6, Philipson pulley, and all accessories; £40; seen at Aldershot.—Box 1,556, c/o The Motor Cycle. [X7078]

## N.S.U.

N.S.U. 1914 4 h.p. Twin, mag., 2 speeds, new tyres; must sell; 17 gns.—1, Ebner St., Wandsworth. [9208]

N.S.U. 2½ h.p. Twin, running order, mag., spring forks, adjustable pulley, good tyres; £12.—154, High St., Yeading, Leeds. [96973]

N.S.U., 6 h.p. twin, Grado pulley, coachbuilt sidecar, new tyres, lamps, runs on paraffin; £25.—112, Stroud Green Rd., Finchbury Park. [9260]

N.S.U. 6½ h.p. Twin (75x94), 1914, loop frame, rear springing, 2 speeds, kick starter, with coachbuilt sidecar; £40.—Engles and Co., High St., Acton, W.3. [X7073]

HAVING Acquired the entire stock-in-trade of the N.S.U. Motor Co., Ltd., we can now supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Engles and Co., Acton Hill Works, Acton, W.3. [X7076]

## O.K.

1916 O.K., 2½ h.p. J.A.P. engine, 2-speed, almost new, free engine; £38.

1916 O.K., 2½ h.p., 2-stroke, in exceptional nice condition; £25.—Percy and Co., 337, Euston Rd., London, N.W.1. [9382]

1916 O.K. J.A.P., 2-speed, little used; £25.—Box 1,346, c/o The Motor Cycle. [X6908]

O.K. Juniors.—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn. [0910]

## Omega.

1915 Omega, 2½ h.p., 2-stroke, in excellent condition; £18.—Percy and Co., 337, Euston Rd., London, N.W.1. [9375]

## P. and M.

P. and M., 3½ h.p., 2 speeds, and underslung sidecar; £22/10.—Motor Exchange, Horton St., Halifax. [9249]

P.M., 3½ h.p., 1913, 2-speed, sidecar, good condition; sell £35, or exchange higher power.—Pratt, Decorator, Tottenham Lane, Hornsey. [9182]

6 h.p. P. and M. Combination, 90° twin engine, P. and M. coachbuilt sidecar, speedometer, etc., fine turn-out; £75.—Farrar's Motories, Hopwood Lane, Halifax. [9037]



## MOTOR CYCLES FOR SALE.

## Precision.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Precision, 1914, 4h.p., T.T., 18 gns.; another, similar, with clutch, 19 gns.; another, similar, with 3-speed gear, 25 gns. (D) [9363]

## Premier.

**PREMIER**, 3½h.p., Armstrong 3-speed, with wicker sidecar, with lamps and accessories; £20.—St. Edmund Garage, Northampton. [X7021]

**3½h.p. Premier-Enfield Motor Cycle**, low built, round tank, serviceable mount; £15; guaranteed.—Wauchope's, 9, Shoe Lane, London. [9292]

**PREMIER**, 1915, 3-speed countershaft gear, lamps, new tyres, Premier coach sidecar, equal to new throughout; £55.—280, Camberwell Rd., S.E.5. [9101]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Premier, 1915, 3-speed, coach sidecar, 48 gns.; ditto, 1914, coach sidecar, 38 gns. (D) [9356]

**PREMIER**, 3½h.p., Sturmer-Archer 3-speed, free engine, Bosch mag., lamps, Coway speedometer, perfect condition, wicker sidecar; £30.—27, Allen St., Sheffield. [X6969]

**3½h.p. Premier**, B. and B., Bosch variable, F.E., and 32 clutch, just overhauled, very fast; owner joining up; £20; between 8 and 6.—75, Park Rd. N., Acton, W. [9223]

## Quadrant.

**QUADRANT**, 4½h.p., 1916, 3-speed countershaft, coach sidecar; £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8916]

## Radco.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Radco, 1916, 2-strokes, fine order; 19 gns. (D) [9365]

**1916 Radco**, 2-stroke, condition as new, just overhauled, reliable mount; £20.—Wellboy Motor Garage, Woodford Rd., Forest Gate. [9268]

## Regal.

**REGAL-PRECISION**, 4h.p. twin, T.T., Jardine 2-speed countershaft, with clutch and starter, special engine, and very fast, in thorough good condition, and tyres as new; £35; exchanges considered.—22, Blythwood Rd., N.4. [9336]

## Rex.

**REX**, 6h.p., clutch, Radco forks, Bosch, Binks; £12.—75, Clive Rd., Dulwich. [9262]

**REX**, 1913, 6h.p., 2 speeds, Turner sidecar, excellent condition; £48.—H. Hawes, Benthill, Buckingham. [X6906]

**1913 Rex**, 5-6h.p., 2-speed, free engine, B. and B., Bosch (overhauled); London.—Box L4,880, o/o The Motor Cycle. [9092]

**REX**, 6h.p. twin, n.i.v., Rac 2-speed, free, handle start, good order, Bosch mag.; £14 only.—Hubbard, 60, Chalk Farm Rd., London, N.W. [X6728]

**REX**, 6-h.p., 1914, and sidecar, 3-speed gear, hand clutch, kick starter, lamps, dissolved acetylene; £35.—Capt. Holt, 16, O.C.B., Kinnel Park, near Rhyll. [X5664]

**REX**, 5-6h.p., o.i.v., 2-speed, F.E., handle start, new tyres and belt, perfect throughout; £28, or near offer; after 7 p.m.—473, Lordship Lane, Dulwich, London. [9132]

**REX Twin**, 2-speed, 1913, new 1915, perfect, lamps, speedometer, coach sidecar, Walbro wind screen, 4,000 miles only; £35.—4, Woodland Park, Newport, Mon. [X7068]

## Rover.

**ROVER**, new combination, 3-speed countershaft, and T.T. models actually here.—Moss, Wem. [X6978]

**COLMORE** Depots Birmingham and Manchester, for quickest delivery of Rover motor cycles. [0883]

**ROVER**, 1918, new 5-6h.p. twin model, for immediate delivery.—Christie Bros., St. Andrews. [9108]

**ROVER**, 1916, semi T.T., Philipson pulley, very little used; bargain, £40.—F. W. Hicks, Walsall Rd., Willenhall. [X6724]

**ROVER**, 1916, 3½h.p., 3-speed, countershaft, clutch, speedometer; £59.—Griffin's, 89, Gt. Portland St., W. [8936]

**ROVER**, 1914, 3½h.p., T.T. Model, with Philipson pulley, very smart condition; £29/10.—Motor Exchange, Horton St., Halifax. [9247]

**IN STOCK**, 1918 Rover twin, 5-6h.p. J.A.P. engine, 3-speed countershaft gear.—W. Brandish, Rover Agent, Fok-dill Rd., Coventry. [X7117]

**ROVER Motor Cycles**; immediate delivery latest 3½h.p. variable gear and T.T. models.—P. J. Evans, John Bright St., Birmingham. [9150]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Rover, 1917 de Luxa, coachbuilt combination, cost £96, mileage 4,000; 69 gns. (D) [9357]

**LATE** 1914 T.T. Rover, condition as new, 60 m.p.h. guaranteed; best offer; owner going Overseas; spare tanks fitted for substitute.—Lord, 36 Company, M.T., Snydenham. [X6740]

**ROVER**, 3½h.p., late 1916, 3-speed countershaft, kick starter, head lamp, generator, rear lamp, very nice mount, perfect throughout; £55.—Mebes and Mebes, 156, Gt. Portland St., W.1. [8558]

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1917 **LEVIS POPULAR**, 2-stroke £32 0

1917 **LEVIS**, 2½ h.p., 2-speed ..... £47 10

1917 **NEW IMPERIAL J.A.P.** .. 40 Gns

1917 **ROVER** and Sidecar .... £106 5

1917 **ROVER T.T.**, Philipson .. £67 10

1917 **ROVER**, 3-speed countershaft ..... £80 0

1917 **T.T. ROVER**, slightly used 57 Gns

1916 **BROUGH**, 2-speed ..... 48 Gns

1914 **DOUGLAS**, 2-speed, splendid condition..... 36 Gns

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## MOTOR CYCLES FOR SALE.

## Rover.

**ROVER** 1917 3½h.p. Combination, complete with Lucas lamps and horn, as new, only done about 800 miles, Buryham 5 gns. motor suit included; £90.—Dr. Martin, 4, Main St., Kirby Lonsdale. [X7054]

**3½h.p. Rover**, foot clutch, drip feed, B. and B., 32 Bosch, good tyres, good running order, Brooks 170 saddle; £25, or exchange 2½h.p. lightweight; trial here.—J. Cox, Thame Rd., Chinnor, near Wallingford. [X7006]

**ROVER**, 1918, 5-6h.p., 3-speed combination, £124/10, or solo £97/10; also 1917 3½h.p. actually here, our price £99/4/6, present day price £106/4/6; also brand new 1915 3½h.p. solo, with lamps, horn, bargain at £68/10; easy payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9154]

## Royal Ruby.

**ROYAL Ruby**, 1914, 2-stroke, perfect condition, single gear; £23.—Shepherd, Station House, Kearsley. [8827]

**1917 Royal Ruby**, 2½h.p. J.A.P., 2-speed, all accessories, under 400 miles; £40; practically new.—Scaford, Mount Rd., Fleetwood. [X6940]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—New 1917 Royal Ruby, 4h.p. J.A.P., Sturmer 3-speed countershaft; list over £80, to clear 69 gns. (D) [9362]

## Rudge.

**I.O.M. T.T. Rudge**, in fine order, complete; £49/10.—Cross, Jeweller, Rotherham. [X7022]

**RUDGE Multi**, 3½h.p., 2-speed, sidecar; bargain, £36.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8917]

**RUDGE**, I.O.M., almost new, exceptional fast machine; £50.—Percy and Co., 337, Euston Rd., London, N.W.1. [9383]

**T.T. Rudge**, Senspray carburettor, mag., good tyres, perfect running order; £24.—Bedford Works, Bedford Rd., East Finchley, N.2. [9374]

**1913 Rudge Multi**, in splendid order, £31; with sidecar £34.—Jones' Garage, Broadway, Muswell Hill, N.10. Deferred payments arranged. [9162]

**1912 3½h.p. Rudge**, Grado Multi gear, very fast, reliable, and fully equipped; 19 gns.—Wellboy Motor Garage, Woodford Rd., Forest Gate. [9271]

**RUDGE Multi**, 1914, 3½h.p., re-namelled and overhauled recently, new tyres and belt, speedometer, lamps, tools, etc., 95 m.p.g. on paraffin; bargain, £25; exchange Douglas, cash adjustment.—21, The Hale, Tottenham, N. [9241]

## MOTOR CYCLES FOR SALE.

## Rudge.

**1913 3½h.p. Rudge Multi**, lamps, generator, speedometer, horn, Whittle belt, fast mount; £26.—Wellboy Motor Garage, Woodford Rd., Forest Gate. [X9270]

**1913 Rudge Multi**, 3½h.p., clutch, coachbuilt handlebar sidecar, T.T. bars, also touring, condition perfect; sacrifice £25.—139, St. Michael's Hill, Bristol. [9285]

**3½h.p. 1913 Rudge**, single-speed model, generally 32 overhauled, mechanically sound as new, tyres excellent; £25; guaranteed.—Wauchope's, 9, Shoe Lane, London. [9283]

**3½h.p. Rudge Sporting Combination**, fitted with new 15 gns. sidecar, 1913, in splendid condition, and guaranteed; bargain, £32/10.—Gadd, 16, South Briscoe Mews, Bond St., W. [9104]

**1915 3½h.p. Rudge Multi**, fitted with lamps, generators, horn, speedometer, pump, tools, and spares; bargain, 40 gns.—Wellboy Motor Garage, Woodford Rd., Forest Gate. [9269]

**RUDGE**, 1916, 4½h.p., hand clutch, Senspray carburettor, G.A.V. mag., condition as new, mileage only 1,800 miles; first cheque over £30 secures, must sell.—19, Seagry Rd., Wanstead. [9318]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1917 Rudge Multi, as new, 48 gns.; 1914 T.T. Rudge Multi, 32 gns.; 1913 Rudge Multi, 24 gns.; 1912 Rudge, 2-speed, clutch, 19 gns.; 1913 T.T. Rudge, 22 gns.; T.T. clutch Rudge 19 gns. (D) [9364]

## Scott.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1914 Scott, 2-speed, clutch; 32 gns.; in good order. (D) [9358]

**SCOTT**, late 1914, and coachbuilt sidecar, all in first-class condition; £48, no offers.—Sparkes, Mayfield Park, Fishponds, Bristol. [X6946]

**SCOTT**, delivered Dec., 1915, with coachbuilt sidecar, speedometer, mechanical horn, perfect condition; £40, no offers.—Colecot, Bynullah Park, Enfield. [9078]

**SCOTT**, 1914, and sidecar, 2-speed, kick starter, 2-cyl., 2-stroke, Binks carburettor, Stewart speedometer, Palmer cord tyres; £55; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7109]

**SCOTT**, 1914, and wicker sidecar (nice shape), 2-speed, kick starter, twin, 2-stroke, 3½h.p., excellent running condition; £35; also many parts of 1911 Scott engine; week-ends.—Hills, 11, Alexsadr Gardens, Folkestone. [X6957]

## Service.

**SERVICE**, 2½h.p., 2-stroke Peco engine, chain and belt drive, 1915, a very reliable proposition, 2-speed, Harcourt extra cooling fins; £35; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7108]

## Singer.

**SINGER**, 4½h.p., late 1914, 2-speed countershaft, Bosch mag., B. and B. carburettor, heavy Palmer cord on back, heavy Dunlop on front, P. and H. lamps, Pedvel belt, Brooks 170 saddle, with sidecar, £35, without £32.—J. Ambler, Braiseworth, Garrison Lane, Felixstowe. [9181]

## Sparkbrook.

**SPARKBROOK**, 1915 or 1916, 2½h.p., will run between 90 and 100 miles to the gallon, has run about 2,500 miles, large supply of tools, tyres in excellent order, head and tail lamps, Senspray carburettor, splendid hill-climber; owner leaving for East Africa.—Apply, Heath and Wiltshire, Ltd., Motor Works, Bordon Camp, Hants. [9061]

## Stag.

**STAG**, 4½h.p., 1914 engine, 2-speed, coach sidecar, thorough good machine; 25 gns.—Bowley, 68, Station Rd., Ilkeston. [X6913]

## Sun.

**COLMORE** Depots, Birmingham and Manchester, for delivery from stock of all models of Sun motor cycles. [0807]

**1915 Sun-V.T.S.**, 2-speed, in good condition; £25; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [9312]

**SUN-VILLIERS**, late 1915, fully equipped, splendid condition; bargain, £18/10.—Harris, 3a, Station Parade, Ealing Common. [9236]

**SUN-VILLIERS**, 1916, 2-stroke, 2-speed, in first-class order and condition; £25.—Percy and Co., 337, Euston Rd., London, N.W.1. [9391]

**SUN-VILLIERS**, 1915, 2-stroke, 2-speed, speedometer, Klaxon, T.T. machine, guaranteed.—51, Maplethorpe Rd., Thornton Heath, S.E. [9232]

**SUN-VILLIERS**, 2-speed, new, £37/16; V.T.S. single speed, new, £30/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7111]

## Sunbeam

**3½h.p. Sunbeam** and Millford sidecar, in fine order complete; £59.—Cross, Agent, Rotherham. [X7024]

**LATE** 1914 6h.p. Sunbeam, Gloria sidecar, speedometer, watch, guaranteed perfect; 65 gns.—Pence Clothier, Holmfirth. [X6753]

**SUNBEAM**, 6h.p., 1914, Gloria sidecar, Cowey speedometer, lamps, horn, Piliho seat, new tyre no vet put on, tools; £78/10.—Moss, Florist, Feltham Middlesex. [9091]



# THE MOTORCYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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## Gas Containers.

**T**HE future of coal gas as a fuel is undoubtedly dependent upon the methods arrived at for storing it aboard the vehicle in a safe and compact container. We have never held forth very much hope for the success of the gigantic gasbags containing the fuel at atmospheric pressure—particularly for motor cycle use. Such a measure, at the best, can be regarded only as temporary, and though in the case of a sidecar it may answer fairly well, few solo riders would accept the alternative of towing a huge trailer for the purpose of carrying their fuel, though, of course, it has a future for testing engines on the bench, as we pointed out in August, 1916. Had the idea been suggested a year or two ago it would doubtless have caused much merriment, though in the face of present necessity anything within reason is preferable to storing one's machine.

The matter of wind resistance is an important one in connection with the balloon system of carrying the fuel, for, no matter whether the bag be mounted on the sidecar canopy or on a trailer of its own, wind resistance is a serious factor. An even greater drawback, and one which practically rules the trailer off the boards for permanent use, is the space it occupies. Few motor cyclists are possessed of sufficient garage space for such an equipment. Indeed, the majority are hard put to it to find a humble residence for a sidecar outfit, to say nothing of an outfit occupying the space of a Rolls-Royce. Particularly does this apply to those who use their machines for running backwards and forwards to business, for at the business end the space available is generally of the cycle rack order.

The compact cylinders, more or less flexible in construction, are, on the other hand, distinctly promising, and may prove the key to the problem. Their initial cost is the chief stumbling block; but if some efficient system of recharging is arrived at these containers may safely be regarded as of rather more than

temporary usefulness. Quite a large cylinder of narrow diameter could be stored between the motor cycle and the sidecar body, or by means of a special chassis idle space could be utilised for carrying the container, and, if in this way, fuel could be carried equivalent to one gallon of petrol some future for the system is assured.

As regards the possibilities of the pressure cylinder occupying the place of the petrol tank, it is yet too early to discuss such possibilities. This would be the ideal system, of course, but in the light of present knowledge it is not practicable. For the necessary quantity of gas to be contained in such limited space an enormous pressure would be necessary, and it need hardly be pointed out that in case of mishap the rider's position would not be an enviable one.

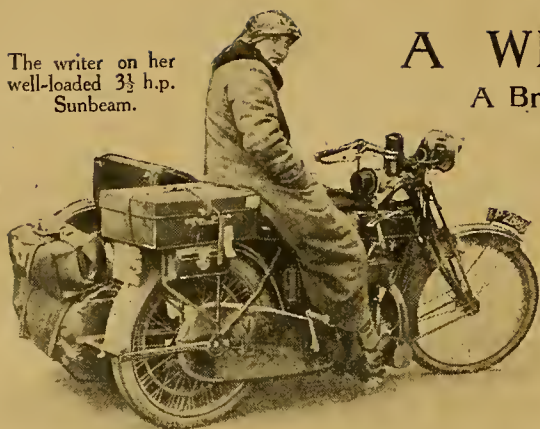
## The New Petrol Regulations.

**A**MONG the many aspects of the new petrol restrictions are two which have not been mentioned, so far as we are aware. One is the case of the soldier on short leave, who is not allowed to use the railway, and must make his journey to see his people—perhaps his last visit before proceeding to the Front—by road or not at all. The cause of such a man is pleaded in our correspondence columns, and all we need say is that the writer and others similarly situated have our sympathy.

The second point is one of justice and fairness. It is agreed, of course, that the country has first call upon the petrol supplies. So far so good, but many a man has a small stock of petrol which he has obtained in a perfectly fair and legitimate manner, and upon which he has paid a tax of one shilling a gallon, and he cannot resell this petrol without a licence; moreover, he has paid his Inland Revenue tax for the complete year; why then should he be prohibited from using the stock of fuel which he has in hand, and which otherwise must be uselessly hoarded?



The writer on her well-loaded 3½ h.p. Sunbeam.



## A WELSH ITINERARY.

### A Brief Description by a Lady Driver of a Sunbeam.

We started our return journey at the beginning of August, and by so doing we were able to get two more gallons of the precious spirit with our licence.

Our return route differed after Hereford as we passed through Ledbury, the Malverns, and Worcester to Stratford-on-Avon, where a night and morning were spent, thence to Oxford, where also a night was spent owing to the terrible weather. The journey was completed *via* Henley-on-Thames, Slough, Kingston-on-Thames, Sutton, and Purley.

The whole journey was without the slightest mishap of any kind, the Sunbeam running most methodically under its extremely heavy load, which touched over twenty-four stone (not including the sidecar)—a very fair weight for a 3½ h.p. machine to carry. The luggage carrier included one large leather kit bag on the sidecar carrier, one suit case on the cycle carrier, and one handbag strapped to the kit bag. In the sidecar there were two tins of petrol, one under the seat and one under the passenger's legs, a fishing bag and two rods, not to mention spare tubes, etc.

The distance covered was 420 miles, and the petrol consumed seven gallons, making an average of sixty miles per gallon, which was very good under the heavy strain of the luggage and the hilly country traversed.

The roads, except around London, greatly to our astonishment, were in splendid condition on the whole, and the surface free from loose gravel.

I might mention in the interests of other lady riders that, wearing an ordinary wide-skirted costume, I ride the Sunbeam in perfect comfort. I advise all husbands and wives who motor cycle to take turns about in driving: by so doing far more enjoyment is obtained from a tour. LP 2880.

**T**OURING in wartime is considered by many to be unpatriotic, but when a man has obtained serious injuries on Service, as my husband has, a short tour within the limits of one's petrol permit is surely quite permissible.

We started in the latter part of July for Llangammarch Wells, in Central Wales, doing the journey of 210 miles in one and a half days on a 3½ h.p. Sunbeam and sidecar. The outfit was very much laden with luggage, as we intended being away for a fortnight.

The route taken from Woldingham, in Surrey, was *via* Oxted, Redhill, Leatherhead, Windsor, Maidenhead, Reading, Hungerford, turning off the Bath Road to the right for Swindon, Cirencester, over Birdlip to Gloucester, where we broke our journey.

Starting again next morning, we passed through Ross, Hereford, Hay, Builth Wells, and then to Llangammarch Wells, where we intended spending our time fishing, but the river was so low that we returned to Hay, where we had good sport in spite of the small amount of water.



The gateway of Gloucester Cathedral.

## THE POLICE AND THE WASTE OF PETROL.

**T**HE Motor Spirit Restriction Order No. 2, 1917, which comes into force on November 1st, is to be strictly enforced by the police, and they have received instructions to that effect. They will have power to stop any motor cycle which they have reason to suspect is being employed contrary to the regulations, and no doubt this will put an end to all forms of joy-riding—although only very little of that exists. In the neighbourhood of certain fashionable seaside and inland watering places the roads will receive special attention, as the authorities are in possession of evidence that there has been great abuse of petrol in this direction. Cars outside restaurants,

hotels, and theatres are also likely to receive similar attention. Inspectors are being employed in various parts of the country in collecting evidence, which, it is understood, will be available before the end of the month. The onus of proving that the car or motor cycle is being legitimately used will not rest with the police, but with the driver of the vehicle.

The attention of the authorities has also been directed to the extensive consumption of petrol by some of the great London stores, who deliver small parcels daily within a radius of forty miles. This is contrary to the policy of the Food Controller, who has asked for a drastic reduction in this direction.





### The Old Type of Flat Twin.

A CORRESPONDENT raises a wide subject when he reminds me of certain rather fundamental differences between the earlier models of the  $2\frac{3}{4}$  h.p. Douglas and those current to-day. Veterans will remember that the Douglas first created a *furor* in an A.C.U. End-to-end trial about 1906, when three experimental machines made their *début*. The unconventional design of the engine aroused interest at the start which changed to incredulous admiration when the little 'uns sailed smoothly up the long rises, holding their own with much bigger machines, and that upon top gear. All three fell out on the English side of the Border, I fancy, solely because of a faulty type of fork. But in top gear hill-climbing and in fuel economy those early flat twins were probably superior to the current types, though they were nothing like so fast or so full of r.p.m.

### His Ideal Machine.

ONE of our readers is entirely out of patience with present-day models. His memory roams back lovingly to the days when the Colliers guaranteed an 8 h.p. automatic inlet twin to climb any hill in England on a 4 to 1 gear. I don't know that the guarantee was really valid for anybody but a neck-or-nothing sportsman, but undoubtedly big twins, tuned for the purpose, will accomplish miracles in the way of easy starting, slow running, and hill-climbing, as anybody who saw a famous 8 h.p. Jap at a certain Haslemere hill-climb will confess. Anyhow, my friend's specification is a  $90 \times 100$  V twin made for pulling, with an old-fashioned valve timing, devoid of overlap, direct belt drive, 6in. engine pulley, 30in. wheels, and with the carburetter and inlet port on the small side. Simplicity, power, top gear climbing power, and fuel economy are obviously the keynotes.

### Anachronisms.

THE above specification is typical of the subdued unrest in the motor cycling world. The whole trend of design for many years past may be summed up in one word, "revs." Practically every engine designer sacrifices fuel economy and top gear climbing and steady slow running to obtain r.p.m. "Revs," I suppose, has been adopted as the designers' motto with two ends in view: (1.) To get a wide range of road speeds, (2.) To get a light engine. Riders who dislike revving engines can assert with much justice that it is possible to obtain speed without piling up r.p.m., and that as a matter of fact, r.p.m. have not produced light weight, so far as tourist mounts are concerned, because such cumbrous items as spring frames and three-speed gears have been added. The consequence is that the anti-revvers find themselves sighing for modernised editions of the old slow-running bulldog single-gearred touring mounts, which were very nearly "go-anywhere" machines, so far as our British main roads are concerned.

### Petrol Consumption.

VARIOUS owners give us such diverse statistics as to their petrol consumption with sister machines that we are bound to recognise some other causes of variation than the vagaries of individual owners and gradual loss of engine tune or appearance of petrol leakages during use. In fact, I strongly suspect that many factories in the pre-war days made no scientific attempt to obtain good fuel economy or to ensure a decent average economy on the machines which they delivered to the public. I understand that the Air Board never orders an aero engine without receiving satisfactory proof of its petrol consumption, that when a contract is given to a maker the acceptance test embodies a trial of fuel consumption, including a maximum limit, and that the actual consumption of every single engine is verified by the A.I.D. when the engine undergoes its duration test. Compared with this the methods of many motor cycle manufacturers are crude and sketchy to a degree. A carburetter of a particular make is selected—often on the basis of its nett cost to the engine maker. A compromise jet setting is adopted on the reports of road tests by the firm's riders, tests which seldom take any special note of fuel economy. This setting is standardised by ordering each machine to be fitted with a jet stamped with a given number. By these crude methods a high average consumption is obtained, and the consumption of two machines bearing consecutive issue numbers may vary by at least 25% to my knowledge, and the average private owner of ordinary ingenuity may, and often does, improve on the makers' consumption.

### As It Might Be.

THE small maker is naturally handicapped, but the large maker could, and should, make precise tests of all available carburetters, and, in arriving at his final selection, he should either select the best or design and make a better for himself. After all, motor cycle carburetters are absurdly simple for the most part, and if an impossibly expensive or delicate carburetter gives the best results in bench tests the maker can embody its governing principles in a vaporiser of his own, as they are seldom patentable in principle. There are no patents governing the principles of pilot jets, mechanical vaporisers, overflow catchers, or multiple jets. When an efficient carburetter is determined upon, careful tests can readily fix, among other things, a maximum and minimum fuel consumption, every engine to be within these limits before passing out of the factory. Very little carburetter tinkering would be necessary if jets were accurately calibrated before issue from store. Some of the worst cases of maladjusted carburetters which I have encountered were due to the adoption of a standard factory setting, which was not safeguarded by calibrating the jets, so that two 34 jets were not, in actual fact, of the same size.





## A Commentary based upon Practical Experience and a Study of Overseas Opinions

**Environment and Design.** A WRITER in this issue dwells upon the influences of environment, and points out that the conditions under which a machine is tested are bound to influence its design. Thus we have the two-stroke Scott, born and bred, as it were, amidst road conditions which strongly resemble those of the Isle of Man T.T. course, specially suited in design for the T.T. race, whereas in other districts, where water-splashes and suchlike difficulties hardly exist, we find manufacturers still standing fast in the opinion that the advantages of the belt drive outweigh its disadvantages—these and other such points being largely a matter of opinion, which, in turn, is ruled by the conditions of one's riding. Thus it is argued that the machine most adapted to Overseas conditions can best be produced amidst such conditions.

There is no doubt a great deal in favour of this argument, but at the same time there is much against it. Manufacture in our Overseas possessions has in the past been sorely hampered by conditions too numerous to discuss, and it is to be feared that this must always be so to a given point. The matter evolves itself purely into one of output and influence. The firm with the largest output naturally holds the strongest influence. It can afford to advertise on an extensive scale, to figure in all great competition events, to speculate in the way of throwing out new branches in faith of expanding markets, and, lastly, it can afford to give superlative value for money—the result of work's experiment carried on amidst ideal conditions and heedless of cost. A Colonial manufacturing house would inevitably have great difficulties with which to contend. Many of those which at present exist might be removed by proper

legislation, but even if this were done the question of output would remain. In England we already have our dozens of wealthy firms eager to obtain Overseas trade immediately conditions permit—firms with years of experience in motor cycle manufacture behind them, and pedal cycle manufacture before that; which, moreover, are located in the midst of engineering centres where the conditions of manufacture are ideal. These are the men the Colonial is up against, and in the face of whose established success his popularity is to be built.

Far be it from us to cast a damper upon Colonial enterprise, but the facts have to be faced. The Colonial firm could, at the best, establish markets in its own country. The Englishman or Frenchman, surrounded by his own industry, would not buy a machine made, say, in Australia, whereas the British manufacturer is assuredly able to open markets in practically any quarter of the globe—if he so choose.

True that in other lines of engineering Colonials have succeeded—agricultural machinery, for instance, but here we are dealing with an entirely different set of deciding factors. Conditions of agriculture in the Colonies are different from those which prevail at home, and therefore the Colonial is the only man to understand and supply his own needs. This does not apply in the case of motor cycles. The British motor cycle manufacturer knows what the Overseas rider wants, and recent experience has forced him to adopt it, so that the cry will no longer exist that British machines are unsuitable for pioneer conditions.

These, then, are a few of the many points the enterprising engineer in our Overseas possessions must realise. If, realising them and



A CANADIAN SCENE.

Taking the hairpin bend at the crest of the sixteen-mile hill on the Lake Shore Road from Toronto to Hamilton.



## Overseas Section.—

appreciating their significance, he still considers success possible, we shall be among the first heartily to wish him the realisation of his desires.

✱ ✱ ✱

## Uncambered Roads.

It is a certain fact that the average Englishman does not possess the haziest notion as to the conditions of travel in most Overseas sections of the British Empire. In India there are many good roads, many assorted, and very many bad. In Australia, Africa, and Canada, the average place-to-place highway is a veritable snorter—vile beyond words, even in dry weather, and a mere belt of swamp when it rains. The roads in the cities are, of course, reasonably good, but leaving the city behind one drops off a step, as it were, and until the next point of civilisation is reached the riding is difficult. France is teaching the Englishman something in motor cycle design which a careful study of Overseas conditions might have taught him long ago, but the Englishman at home is still inclined to become

septicaally jocular when you inform him that you have seen horses helplessly and hopelessly bogged in the main thoroughfare of such and such a city, while the citizens tried to lever them out with planks, and the dogs made a fête day of it. In the same way, when one tries to describe the process of progression along a bush trail after rain, where one is compelled to slide along a track created by pedestrians who are not desirous of sinking permanently into the quagmire of the main trail—a track of slimy undulations and impossible angles, strewn with tree roots, boulders, and logs—he mildly enquires, “But what idiot would attempt to use a motor cycle under such conditions?”

Words fail one in trying to find an adequate reply, but the fact remains that every British make of motor cycle enjoying an extensive Overseas market is subjected in some quarters to such conditions, and the exact tint of the owner's language when he is compelled to lift his machine from the mire every quarter of a mile is limited only by his natural wealth of expression. A few illustrations of Colonial roads are given in this issue.

## A Selection of Letters from Readers scattered all over the World.

## An Overseas Ideal.

LT. G. MATHIESON, Zourba, Nyasaland, an African rider of an Overseas model, writes: “In your paper of November 30th, 1916, now to hand—rather late certainly, but for all that exceedingly interesting—you give us the latest model Norton specially designed for Colonial requirements. A few of us got together (Colonials, of course) to have a chat on this ‘bus, and we can bring only two points before Messrs. Norton Motors, Ltd.

“Before mentioning them, we are willing to admit that the machine is everything to be desired according to the diagrams shown, but should Nortons, Ltd., see to these points we feel sure that their sales here (in South Africa) would be greatly increased.

“Firstly, the silencer is apparently attached to the magneto stand by a stay, so should the silencer get a bad ‘biff,’ as is very often the case in this country, it will also give the magneto a bit of a shaking up. At the same time, the magneto is a bit low for some of these South African roads.

“Now the point that worries us most of all is the front brake. No machine in South Africa should have a rim brake in that position, for, as is often the case, you get a bad dent in the front rim without knowing it, and next time your brake is applied you join the ‘Aviation Corps’ straight away. Cannot a brake something similar to the B.S.A. or Royal Enfield (6 or 8 h.p.) be fixed to the Norton? Then it will be the ‘bus.’”

## American Machines in Canada.

MR. W. R. WARNE, Toronto, Canada, writes: “May I solicit space in your most interesting journal to express the concern I feel at the apparent indifference of British motor cycle manufacturers to Canadian requirements. Are they afflicted with chronic apathy, or do they not realise what is slipping through their fingers while they slumber?”

“There is a splendid market here which they seem to ignore entirely while American traders monopolise the whole business. Hendersons, Harleys, Indians, (American) Excelsiors, etc., are running around in thousands, but, alas! ones eyes are seldom gladdened by the sight of an English machine. A few Triumphs, once used by the police (they now ride Hendersons), an occasional Douglas, or a Matchless, are all that can be seen, and the majority of these are in wretched condition, spares being unobtainable and repairs specialists non-existent.

“All the prominent agents in this city are pushing American goods, and the man who owns an old-country mount has to struggle along by taking care of his own requirements as best he can.

“This state of affairs cannot be wholly attributed to the war, as it existed in pre-war times.

“Local motor cyclists know practically nothing about British products (my own knowledge has been gleaned from the pages of *The Motor Cycle*), and, consequently, swear by the American article. They generally maintain that heavy, powerful machines are essential for negotiating the rough, sandy roads, and are under the impression that nothing built in England is sufficiently robust as regards engine power or frame construction. They regard a machine like the 3½ h.p. Triumph as a lightweight, fit for city use only.

“One thing is certain, our friends at Coventry must get busy, *right now*, go in for quantity production, turn out reasonably priced machines to meet pioneer conditions, institute a really aggressive advertising campaign augmented by a liberal display of suitable models, and, last but not least, make proper provision for the subsequent needs of customers by appointing keen pro-British agents in all important centres. Otherwise, they might as well wipe Canada off the map so far as their trading activities are concerned. In any case, they have a stiff uphill fight before them, which will tax their resourcefulness to the limit.

“I append my address, and shall be pleased to reply to anyone interested who may care to write me, through you, for further information.”

## After Australian Trade.

An American reader writes: “The American agents are very active. During the past twelve months I suppose I have met a dozen direct factory representatives from the States. They have been touring the Commonwealth on organising campaigns. Mr. Davidson, of the Harley-Davidson firm, has been here. The public prefer British and Continental manufacturers, and activity after the war from your side will be gladly met. The Douglas and M.A.G. are still being sold here. The demand for the former is very keen. Shipping restrictions are curtailing American imports quite a lot. A Luxuries Board is sitting at present, but it has done nothing definite with regard to motors. I think the import of tyres will be prohibited.—H.P.M.”

## Prices in the Far East.

A Naval Officer, “Far East,” writes from India: “During my travels in the East I have noticed in widely differing areas the prices of motor cycles. I have just read an advertisement which is one of the *most moderate* I have met with yet, for here one can get a 3½ h.p. B.S.A. for the same money as a 7 h.p. Indian, and the B.S.A. is *only* 200 rupees (£13 6s. 8d.) more than the 5 h.p. Indian! Other correspondents have written on the same theme, and, like myself, seem to think that British manufacturers will really have to buck up. Indians, H.D.’s, and very hoary Triumphs are the usual machines seen here, but on a few occasions I



## Overseas Section.—

have seen a very compact and efficient looking  $3\frac{1}{2}$  h.p. P. and M. sidecar flash past on the superb linoleum-like roads of the town (one of the largest in India). I must entrap the owner some time and have a yarn with him.

"May we look for some revision of Oversea prices after the war? If not I am afraid the British motor cycle abroad will become a *rara avis*. I get my *Motor Cycle* regularly, and have only had one sunk so far. As I keep them for reference I hope you will send me a copy if you have any left.—ORGANISATION."

## Machines for Australia.

MR. SYDNEY TURNBULL, an Australian now in Sheffield, writes us as follows: "I am a keen Australian motorist, and am much surprised at the way the British motor cycle manufacturer has treated us in the past. Very few of the numerous machines made in Britain find their way into the Australian markets.

Why? Well, because the average British-built machine is unsuitable to the conditions prevailing in the land of sunshine and a wful roads. Our markets are full of American machines because the Americans make machines to suit our conditions.

"Why does not the British manufacturer make a bid for our markets? We are British, and prefer British goods.

"The main faults of the British-built machine are these: Spring forks too weak. In my idea, the laminated spring forks would prove a boon. It is quite a common thing to see a machine after a run into the country with its front fork bound up with wire, procured from the nearest fence at the time of the mishap. The ground clearance should be nothing under 7in.

"The wheels require heavier spoking than is used in general practice, and special attention needs to be paid to the mudguarding. Good clearance between the tyre and guard is necessary, for it is a miserable job when riding through thick mud (for which our roads are noted) to have to stop every few yards to scrape the mud from between the tyre and guard to get the wheels to turn at all.

"The fuel tank requires to be of large capacity, for runs of considerable distance are often necessary between townships where petrol is procurable.

"I would recommend an engine of 4 to 6 h.p. for solo work and 8 h.p. for sidecar.

"The cylinders require increased cooling surfaces. Chain transmission has proved itself superlative. Of course, the brakes must be efficient. I should suggest two rear wheel brakes totally enclosed.

"I have no hesitation in saying that if the British manufacturer would put on the market a machine suitable for the conditions, and at a moderate price, he would have no difficulty in selling it, for, though we are thousands of miles away from the Motherland, we admire the perfect workmanship and reliance of the British-made article, and would prefer to support home industries if they will only support us."

## An Endorsement.

H. TAYLOR, Karachi, India: "As an Overseas rider, I should like to endorse the 'wants' Mr. Tom Silver is blowing out of his megaphone on page 589 in your issue of June 28th, 1917, especially the first and second. An enthusiastic motor cyclist friend of mine has just bought an Indian *simply on account of its spring frame and large wheels*; at the same time he says he would have bought an English machine if he could have got one with large wheels and spring frame, even at a much higher price."

## American Trade and Australia.

From a sixteen-year-old Australian, NORMAN WILSON, of Tregeagle, *via* Lismore: "As an Australian reader of the 'Blue Cover'—which I get regularly, although 13,000 miles away—I am pleased to see articles on the above subject.

"To come to the point. America is doing, and will do, an enormous trade with Australia in cars and motor cycles. Its success is due to the war, of course; but in order to wrest the trade from America when peace returns British manufacturers will have to study many things. The British machines are popular. A Douglas, Rover, New Hudson, or B.S.A. sometimes appears in a shop, but it soon goes, as everyone is satisfied with British cycles. The trouble is this—the British manufacturer does not give the Australian a fair deal. He sends a machine out, and the Australian agent sells it for what he likes. We pay £60 for a machine that costs £28 in England. Makers must, after the war, cut the price down to a minimum, send out representatives, and study Australian conditions:

"1. A fast twin for solo or sidecar work is wanted; 7-8 h.p., all-chain drive, straight bars with wrist control, spring frame, big mudguards, and plenty of clearance between wheel and tyre.

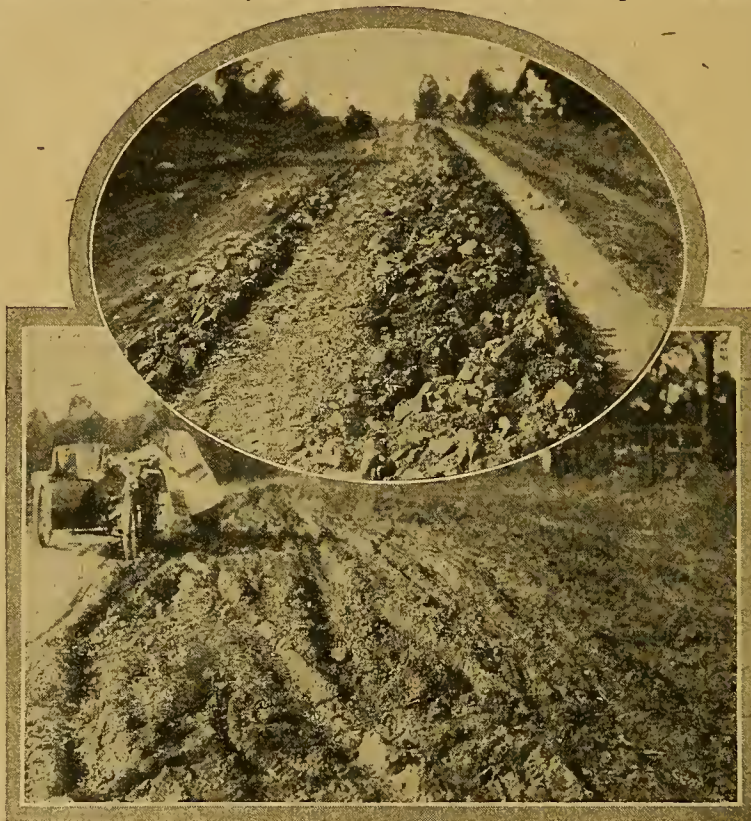
"2. Then a  $3\frac{1}{2}$ -4 h.p. single is needed for business. The spring frame is not so essential here.

"3. A lightweight  $2\frac{1}{2}$ -3 h.p. flat twin or single, with all-chain drive; also your little two-strokes are admirably suited for town work, but for anything else they are not needed much.

"I might also state that a  $3\frac{1}{2}$  h.p. Rover costs £95, whilst an 8-10 h.p. Harley-Davidson costs £97 and a 7-9 h.p. Indian £93 10s.

"But personally I will stick to the Britisher, because it is far more strongly made and will see two Americans out.

"Perhaps you say make them yourself. We cannot manage it at the price. Labour has ruined Australia, I am sorry to say. A little  $1\frac{1}{2}$  h.p. benzine separator engine is made sixteen miles from where I live. It is good, but roughly made, and costs £42 10s. American engines ( $1\frac{1}{2}$  h.p.), just as good and better finished, sell seven miles away for £35. So, sir, we want you to get our trade; we think you can if you will put your back into the job, and we feel satisfied that once you have obtained a grip it will be for good."



## ROADS IN AUSTRALIA.

A sample of the roads to be found near Bankstown, Liverpool, New South Wales.

(See Overseas letter from Sydney Turnbull.)



# ENVIRONMENT AND THE OVERSEAS MACHINE.

(A consideration affecting some points in the development of a world market.)



THE conditions indigenous to the native surroundings of a product like the motor cycle have so large a share in the formation of its characteristics that in those growing countries where such a thing is possible the advent of a local manufacturer will result in the ousting of home firms who hitherto had a connection in that part.

At home, for instance, the variation of local conditions within comparatively small areas have produced types of machines absolutely peculiar to particular districts.

Take the Scott and the P. and M. as an example. These would never have been developed in the London district simply because of the lack of those conditions which made certain characteristics essential in the North.

## Different Schools of Design.

The capability of overcoming the particular difficulties under which a machine is constantly used will be evolved naturally by those responsible for its design if they continually test it under similar conditions, and although the above-mentioned machines have approached their problem from opposite sides—the one as the steady-going business machine and the other as the more sporting rider's choice—each shows the influence upon its design of the paved streets and tramlines, the moorland tracks and the tortuous mountain roads peculiar to the district in which both are produced.

Moreover, there is some significance in the fact that these machines have developed along the lines upon which they were first laid out, and in those competitions which most nearly approached Overseas conditions they showed themselves particularly successful in their standard form.

This is in direct contradistinction to the Coventry school of design, which, to compete under similar conditions, has so often changed its whole policy—its uncertainty of aim being partly ascribable to the fact that the conditions under which the machines are tested are not continuously and sufficiently arduous, and more particularly to the conservatism engendered by the overwhelming influence of the pedal cycle.

Firms with an already established business in push cycles took up the motor cycle more or less as an experiment, relied too much upon the drawing office in the first place, and then handed out their machines to testers more often than not too youthful to pass a sound or well-considered judgment.

On the other hand, those firms that are outside the "hub of the industry" have mostly been small enough to ensure the design's growing up and being continually tested under the eye of the producer himself. His output has largely been absorbed within the immediate vicinity of his factory, and

whatever failures have occurred have been brought almost immediately under his eye.

The A.B.C. is a machine produced in a district almost devoid of hills and under the immediate influence of a great racing track—therefore there is nothing more natural than the claim and ability for continuous high speeds as the greatest talking-point in its programme; and similarly, if the Douglas had been produced by a pedal-cycle firm in the undulating Midlands, the advent of its two-speed gear box (which really marked the initiation of its success) might have been delayed for several seasons.

It is hoped that the reader has followed the trend of these remarks sufficiently closely to see the conclusion which may be drawn, for if so he will not be deceived into believing that a standard machine with the engine a little higher in the frame (the design of which is incidentally spoilt) and a two and a half gallon tank is necessarily the Overseas model of the future.

The man who designs the best machine for any part of the world is the man who lives there, who can build it there and test it continually under the conditions found there, and our own manufacturers who seek Overseas markets must eventually be compelled either to build branch factories abroad or employ a designer who is thoroughly conversant with the nature of the country it is proposed to open up for trade; this designer must be allowed to select some particular district in the British Isles which most nearly approximates in conditions to the Overseas locality, and here his machine must be tested—to destruction, if necessary.

## The American Plan.

A third alternative is to copy the success of the American and design a machine to meet the worst possible conditions (although here, again, environment must decide exactly what qualities are necessary), and sell it broadcast with the knowledge that if it will stand the worst it will naturally be usable anywhere; such a method is not only crude in itself, but lays itself very much open to local competition whenever the conditions are sufficiently easy to render a less substantial machine desirable.

Considering all things, then, manufacturers with an eye to the Overseas market, and the Overseas public with an inclination towards the motor cycle, must realise that there are considerations, economical and philosophical, quite apart from the merely mechanical, which will have a large bearing on the production of the ideal Overseas machine, and it does not follow that success will smile upon the owner of a large factory who, *après la guerre*, dumps his surplus output in some corner of the world to face conditions of which he has no ken.

WHARFEDALE.



# THE Critic

## Fireside Chats on Motor Cycle Problems

### COLOUR AND FINISH.

"LET us hope," said the Novice, "that the sensible all-green War Office finish will stick."

"Let us hope," sighed the D.R., "to heaven that it won't!"

The Novice sat up with a snort as though he had bitten his tongue. He was pretty used to unfettered contradiction from the D.R., but he preferred it with a little varnish of come sort.

"Well I'm blowed," he exploded. "I thought that you, at any rate, were a commonsense rider, who'd back me up. Surely any practical motor cyclist prefers all-dull finish to an assortment of plated parts?"

"I think," put in the Journalist, "that I rather like plated parts, so long as it isn't American plating."

#### Gaudy Finish.

The D.R. was lighting a cigarette. He addressed himself to the Novice. "I like a dull finish," he agreed, "but I don't like War Office green, or any other green. My first experience of it was with the P. and M. when that firm first adopted it. It didn't seem to me to wear anything like so well as black, though the P. and M. people do things well. Then, again, you could never match it. I had to fit a new mudguard, and it was two shades lighter than the rest of the machine. Mr. Moore told me that they seldom got two casks that matched in shade."

"It looked jolly nice, anyway," put in the Journalist. "But I think one of the most handsomely finished machines I ever saw was of the same make—chocolate-coloured, with black panelling and gold lining."

"Topping—when new," agreed the D.R. "But directly its virgin lustre is gone it looks like Bobby Burns's fair, blushing maiden—all soiled by the world in her tattered finery."

"I agree," put in the Novice. "Any kind of soiled finery is not nice, while one need never be ashamed of the everyday, hard-working black when it becomes a bit the worse for wear. For instance, you don't object to wearing an old cap or soft hat, which, though shabby, makes no pretence, but you would object to walking through Coventry in an old and disreputable top hat."

"I should object to walking through Coventry in a top hat of any sort," grumbled the Journalist.

"Well," pursued the Novice. "Seems to me that much the same applies to motor cycles. You may buy clothes for one festive occasion that you would not dream of wearing till they are worn out, but motor cycles are not intended just

for one festive occasion. Why, then, rig them up in gala costumes? What they want is the good old serviceable tweeds of every day life, which will wear to a finish."

"Like the Manufacturer's Norfolk jacket," put in the D.R. "He has worn the same old jacket ever since I knew him. It has stuck to him like the bark of a tree, and he will probably continue to wear it till he becomes hoary with age."

The Manufacturer snorted. "What's the matter with plated parts?" he queried. "The press has been dead against them since goodness knows when. I disagree absolutely. Scores of riders tell you that they hate plate, yet these are generally the very men who appreciate smart appearances. Plating is not half so bad as certain writers like to make out, and I think this dull uniformity of colour, without relief—i.e., the War Office finish—is hideous."

"I quite agree that the War Office daub—one can hardly call it finish—is hideous," agreed the D.R. "But what about the all-black Sunbeam? Nothing could look nicer or wear better."

Here the Journalist had something to say. "Look here," he began, "it isn't so much a matter of no plate. I agree with the Manufacturer that plate is not so bad as it is painted, while nothing sets a machine off to better effect than a few bright parts. What I am looking for is a hoseable machine—one that you can wash as you would wash a pony cart. Ordinary plated parts do not prevent that, but what *does* prevent it is rotten hub design, leaky chain cases, and exposed magnetos. Set these things right and we can wash our machines decently, and it is an easy matter to rub the water off a few plated parts."

#### Neglect and Depreciation.

"I don't agree," retorted the D.R. "Certainly we want the hoseable machine, but it must be minus plate. Personally, I look upon bright finish as an intolerable nuisance. It looks shabby after each wetting, and if you want the machine to sell decently your only alternative is to keep all the nickel smeared with vaseline. Then you get it on your hands, your clothes, in your hair! Heaven knows, a motor cycle is an oily enough proposition of its own accord without having to add grease to its naturally clean parts."

"My sentiments exactly," the Novice backed him up. "I want a good, sound, working proposition—a machine which I know will not deteriorate unduly even if it is not cleaned after periodical blinds

over mud-immersed roads. I haven't the time or inclination to bother with bright finish; and when, eventually, an opportunity of cleaning it *does* turn up, I want to be able to do it with a minimum of trouble. Well, all-dull finish is the only way. Who would think of turning out a pony-cart with plated rims and a plated back step!"

#### Two Simple Alternatives.

"I must agree," admitted the Journalist, "that plating can be carried to the point of absurdity—plated spokes and rims, for instance! Then, diverting for a moment, I do not care for the plain aluminium crank case. Oil accumulates on it till it assumes the consistency of paint, and unless one uses the paraffin brush pretty regularly, it is almost impossible to remove this disreputable coating from the nooks and corners. I don't know whether any of you have tumbled to the fact that one reason why the Indian engines always look decently clean is on account of their painted crank cases, which do not show the dirty oil, and towards which the oil does not seem so tenaciously inclined as it is towards aluminium. But to return to the subject of plate—go on, Manufacturer."

The Manufacturer went on. He pointed out that opinions are clearly divided as to the desirability of plated parts. "Some people like them and some people don't," he said. "Those who don't like them have two alternatives. Either they can enamel them over with a camel-hair brush, or they can keep them greased. If, on the other hand, we turned out machines with no plated parts, the man who appreciates a touch of lustre is absolutely done. Now I would like to know why the D.R. goes to the trouble of regularly greasing all his plated parts instead of enamelling them, and so doing away with the various objections he raises."

"Too much fag," replied the Discharged Soldier dreamily.

The Manufacturer regarded him pensively. "Is that really it?" he queried, "or is it because you realise somewhere at the back of your mind that the man who is eventually going to buy the machine from you may like a little plate? Isn't it partly because you know that you might lose a customer by robbing the machine of all possibility of lustre?"

"That may partly be so," admitted the D.R.

"Yes. There you are! There you find yourself in the position of the Manufacturer. Now if you object to vaselining your plated parts, and don't want to obliterate them for good, you can



**The Critics.—**

easily protect them by applying a coating of stove enamel thinned with petrol. It can be rubbed off by the energetic application of a rough cloth soaked in paraffin, and will protect the plate indefinitely, so that the machine can be made to look really smart when it comes to selling."

"All that's very true," agreed the D.R., "and incidentally it brings us back to my previous argument regarding frame finish. It illustrates the superior usefulness of black to any other colour

you like to name. A black machine can at any time be touched up with a brush, and its enamel preserved, without any difficulty about matching the shade. You can match it at any village store, and quite apart from this, black enamel is the hardest and most durable."

"I don't think anyone would disagree with that," said the Journalist. "Personally, I have possessed machines of all shades and colours, but for the rest of my days I don't want anything but black. Nothing wears like it, and it is so easily retouched. As for plated parts

—give me a plated flywheel rim, plated hubs, and plated pipe connections. The bars, I think, should be black, as when you have lamp, horn, speedometer, etc., fitted it is difficult to get between them at the plate, which becomes patchy and finally perishes, owing to the moisture which lingers about the fittings."

This seemed to conclude the debate, and each of the four was well satisfied that he had illustrated his point—quite oblivious of the fact that the discussion had left them at the exact point from which they started.

## THE ALLON TWIN TWO-STROKE.

### Details of Minor Improvements.

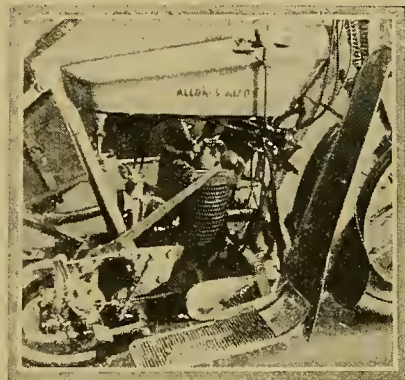
IN our issue of June 15th, 1916, we described a very novel twin two-stroke motor cycle, viz., that manufactured by Messrs. Alldays and Onions, Ltd., of Matchless Works, Birmingham. This machine has now undergone several minor alterations.

It will be remembered that the bore and stroke of each cylinder are 70×76 mm., giving 584 c.c. for the two cylinders, being rated at 5.6 h.p. The two cylinders are cast in one, and, of course, are vertical, the two pistons thus travelling in parallel lines. Some minor alterations have been made in the casting of the cylinders, there now being a gap between them to facilitate cooling, while the fins have been considerably increased in depth. Originally the magneto was mounted on a platform cast in with the crank case, so that the magneto itself

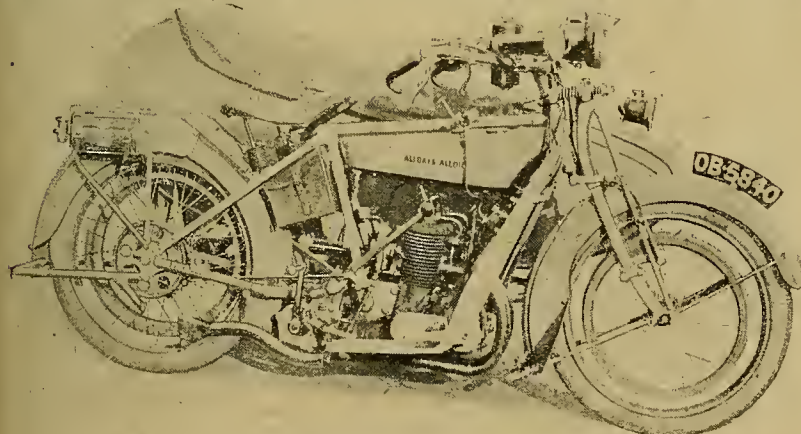
was brought to the rear of the cylinders. Now the magneto is placed in the more conventional position at the front of the crank case, and the position previously occupied by it is now taken by the carburetter. This alteration has resulted to some extent in lightening the engine.

Another minor alteration is the fitting of two separate exhaust pipes, so that each cylinder has a separate exhaust to a large silencer fitted at the rear of the engine. The sparking plugs are now at the front of the engine, so that they receive full benefit of cooling air draughts; and the oiling system has been simplified with direct leads to each bearing and to each piston. The frame has been altered in constructional details, although not in appearance, so as to make it lighter without in any way reducing its strength or rigidity. It will possibly

be remembered that efficient leg shields were provided, running from the region of the front forks to the front of the footboards. These leg shields are still retained.



The side by side twin engine is  
70 × 76 mm. = 584 c.c.



The 5 h.p. twin two-stroke Allon, which has undergone detailed alterations

The transmission is by means of the ever increasingly popular Sturmey-Archer countershaft three-speed gear driving through chain and belt. The braking is particularly efficient, the front brake consisting of a pull-up block acting on a dummy belt rim mounted on the front wheel, while the braking of the rear wheel consists of an external contracting band brake. Previously the rear brake was of the internal expanding type. The general elegant lines of the machine and the roominess of the Cooper sidecar will be readily appreciated from the accompanying illustrations.

### LOCAL TAXATION LICENCES.

A CORRESPONDENT recently bought a motor cycle and did not use it on any occasion, for the reasons that it had been partly dismantled, was under repair, and that its owner could not obtain any petrol for it. Although these facts were explained to the L.C.C., our correspondent received a threatening letter, in which the incorrect statement was made that the law requires that a licence shall be taken out by every person who keeps a motor cycle. It was also mentioned that unless the licence

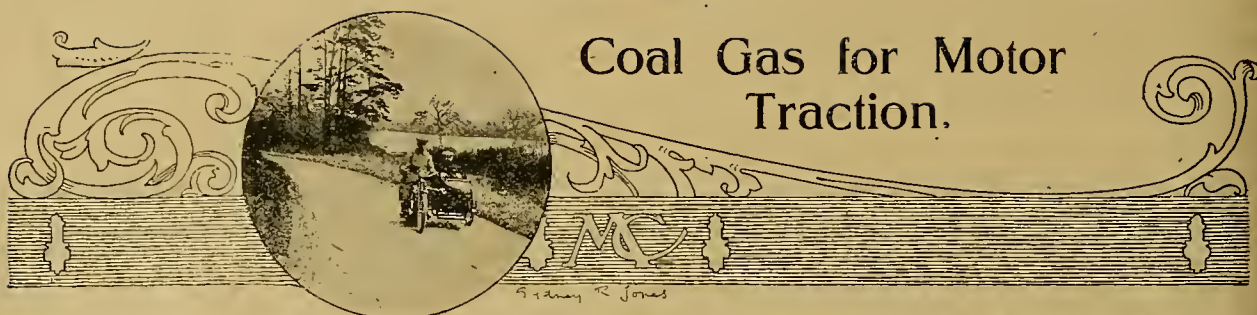
was taken out by a certain date it would be assumed that he preferred to have the case referred to the magistrate. We placed the facts before the A.C.U. solicitor, who, despite the man not being a member, took up the case vigorously on his behalf, and received from the L.C.C. solicitor the following letter:

"I agree with the general principle that a person merely having a carriage in his possession is not necessarily liable for carriage tax, but I cannot, of course, express an

opinion upon the particular case to which you refer without having all the facts before me."

Unfortunately, our correspondent prejudiced his case by paying the licence in the meantime, and there is, more unfortunately, no chance of his getting it back, whereas had he not paid the tax it was very doubtful if the L.C.C. would have taken proceedings against him. Of course, if a machine is used on any occasion whatsoever then it becomes liable to licence duty.





## Coal Gas for Motor Traction.

### Types of Containers, and Cost of Running with Coal Gas compared with Petrol.

OUR sister journal, *The Autocar*, on October 20th published an interesting paper read before the Manchester, Liverpool and Counties Branch of the Commercial Motor Users' Association by Mr. W. M. Barrett, of the Manchester Corporation Gas Department. In his paper Mr. Barrett sets forth much useful information concerning the application of coal gas for motor propulsion. He deals with the inefficiency of the present system of utilising coal gas, pointing out that it is impossible to obtain really good results unless some intelligence be used in carburetting the air with correct proportions of gas.

The four types of container discussed may be briefly tabulated as follow:

- (1.) The flexible type containing gas at atmospheric pressure.
- (2.) The semi-rigid type made of some strong fabric in which gas can be stored at a pressure of, say, 15 lb. per square inch.
- (3.) The semi-rigid cylinder of considerable tensile strength, designed to maintain very high pressures.
- (4.) The steel cylinder.

#### Low Pressure Containers.

No. 1 can first be discussed. Its chief disadvantage is that it occupies considerable space, and no great volume of gas can be carried. In the case of a motor cycle it can be set down that gas equivalent to, say, half a gallon of petrol can be carried thus, and in the case of an omnibus gas equivalent to two gallons of petrol. It will be seen, therefore, that this type of container, apart from its clumsiness, is suitable only for short journeys.

Mr. Barrett points out that a great advantage of the rigid type of container (No. 2), apart from its neat appearance, is that the gas can be condensed within it, so that a container that will hold 300 feet at normal pressure can be made to hold 600 cubic feet at 15 lb. pressure. Mr. Barrett voiced the belief that if due consideration were given to the strength of the materials employed, and to the method of bracing the container, this variety could be made to withstand a pressure of 60 lb. per square inch, and then the vehicle would run just four times as far as it would if the container were filled at normal pressure.

#### The High Pressure Cylindrical Bag.

No. 3. The fabric-made container Mr. Barrett favours rather than the steel cylinder type. He points out that great care is necessary in handling steel cylinders subjected to very high pressures, as the vibration, etc., is apt to cause fatigue

of the metal, so that periodical annealing is necessary.

Messrs. Wood-Milne, Ltd., have produced a fabric cylinder capable of resisting an internal pressure of 1,600 lb. per square inch. This cylinder, which is about 4ft. 6in. in length and 15in. in diameter, contains at 1,000 lb. per square inch the equivalent of two gallons of petrol, and uncharged it weighs 60 lb. Two difficulties, which are by no means insurmountable, lie in the way of using gas at these high pressures. The first is that of charging the container. This can only be done in the case of a motor cycle by means of a special pumping appliance. The second difficulty lies in the necessity of a pressure-reducing valve of sufficient compactness to comply with the needs of motor cyclists.

It would appear that the Manchester Gas Department has made the following proposals to the various gas undertakings:



COAL GAS CONTAINER BUILT OF FABRIC AND RUBBER.

The Wood-Milne coal gas container, which weighs only 60 lb. It is built up of fabric and rubber, and will carry at 1,000 lb. per square inch pressure the equivalent of two gallons of petrol. The cylinder is the invention of Mr. John Muir, sales director of the Wood-Milne Tyre Co., Manchester.

"To install special automatic coin-operated meters, fitted with necessary connections, and capable of passing 1,600 cubic feet per hour, in various places on the principal routes. These meters are to be fitted with 20ft. lengths of flexible pipe, and are to be placed at garages or other similar establishments on the main roads, and to be fixed free of charge to the tenants, who are to be allowed a rebate of 10% on the value of the gas passed. Tokens to be purchased at the offices of the gas undertaking, each token operating every meter for 100 cubic feet of gas. A booklet to be issued, giving the names and addresses of the establishments where the meters are fixed."

#### Relative Cost of Running.

Dealing with the comparative cost of running on coal gas compared with petrol, Mr. Barrett took as his basis the value of both fuels in British Thermal Units. The British Thermal Unit is the quantity of heat required to raise the temperature of 1 lb. of water through 1° Fahr. The calorific value of coal gas is settled by Act of Parliament at a minimum of 500 B.Th.U.'s per cubic foot. Mr. Barrett states that he has found that one gallon of petrol when carburetted with air and the mixture consumed as a Bunsen flame inside a Boys calorimeter contains 145,000 B.Th.U.'s, and therefore 290 cubic feet of 500 B.Th.U. coal gas would have to be consumed to obtain a total of 145,000 B.Th.U.'s. It will be seen, therefore, from this reckoning that 290 cubic feet of coal gas are equivalent to one gallon of petrol, but, the speaker added, it has been proved over and over again that 250 cubic feet of coal gas will run a motor vehicle just as far as one gallon of petrol, and that if a special gas carburetter be fitted an increased mileage can be obtained.

A Belsize van was placed at Mr. Barrett's disposal, and he was assured by the owner that the average mileage taken over three months was eighteen miles per gallon. During various tests Mr. Barrett found that the car ran 19.2 miles per charge of 250 cubic feet, without any alteration having been made to the engine, beyond the fitting of the gas carburetter.

Even taking coal gas at its worst, and allowing that 300 cubic feet is equivalent to a gallon of petrol, and taking the price of gas as 4d. per 100 cubic feet and petrol at 4s. per gallon, an economy of 78% is effected, when the tax is taken into account, i.e., the cost of gas is equivalent to that of petrol at less than 1s. per gallon.

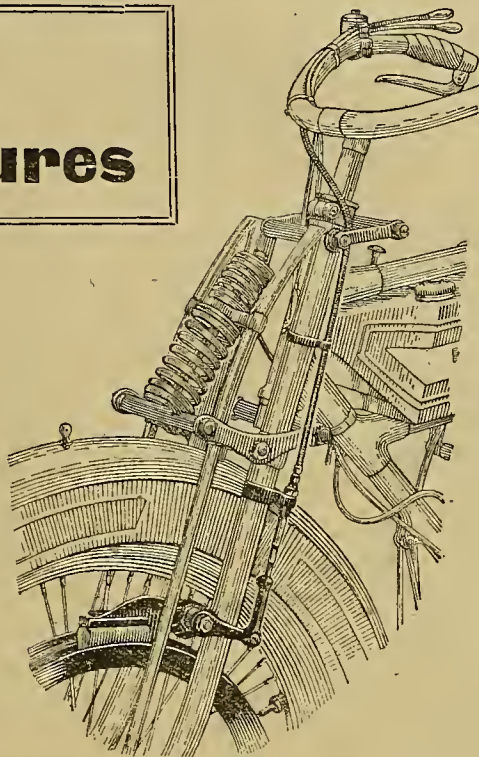


## Some B.S.A. Exclusive Features

No. 5.

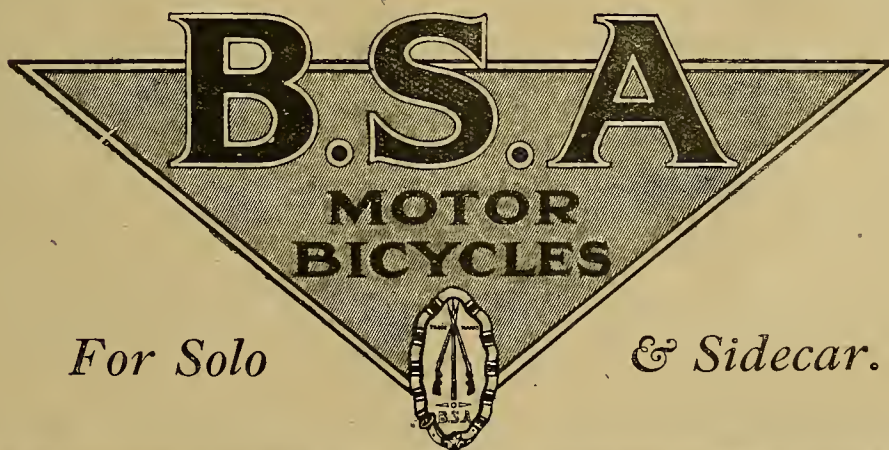
### B.S.A. BRAKES.

**T**WO extremely powerful brakes are fitted to the B.S.A. Motor Bicycle, the front being applied by an inverted lever on the handlebar, and the rear by a foot pedal. Both brakes operate on special brake rims and allow the wheels to be removed without detaching any brake parts or disturbing the adjustments. The efficiency of B.S.A. Brakes and their strength and reliability, fully justify the confidence which riders of B.S.A. Motor Bicycles repose in them.



Write for Latest B.S.A. Catalogue.

THE BIRMINGHAM SMALL ARMS CO. LTD., 47, Small Heath, BIRMINGHAM.



*For Solo*

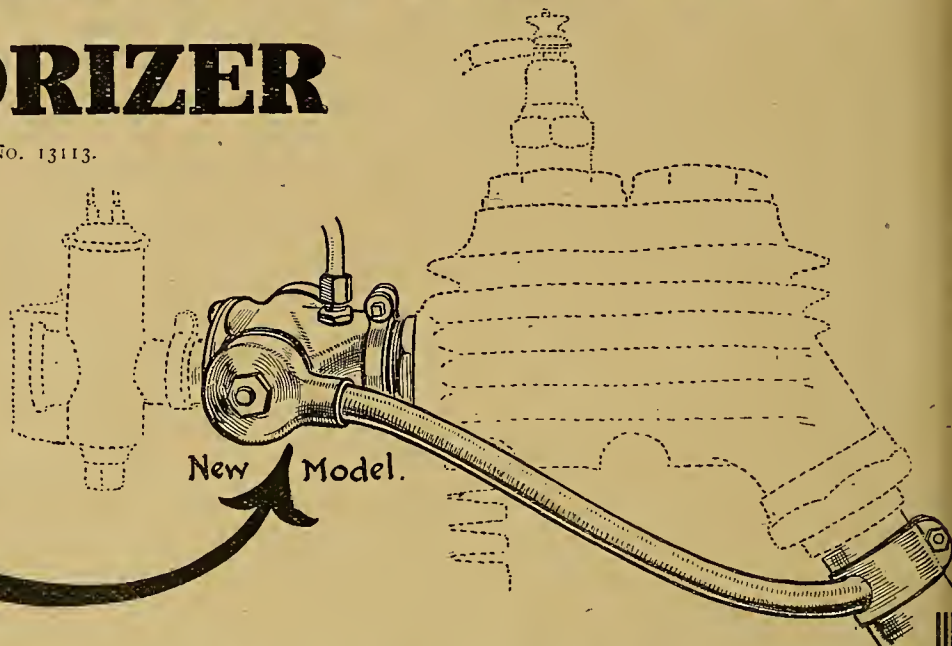
*& Sidecar.*



# "GRADO" PARAFFIN VAPORIZER

PAT. No. 13113.

**PUT  
IT  
THERE**



**Motor Cyclists!** Here is a device which will enable you to run on paraffin and get results equal to petrol. It is designed by a practical engineer, and has been well tested. It fits between the engine and carburetter, and is connected to the silencer pipe by the clip illustrated. An injection of petrol through the tap on top starts your engine. Paraffin then does the work.

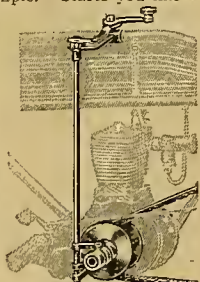
IT IS JUST WHAT YOU REQUIRE TO-DAY.  
DELIVERY FROM STOCK. ORDER NOW.  
STATING OUTSIDE SIZE OF INLET PIPE.

**35/-** PRICE complete.  
Postage 6d. extra.

## The "GRADO" MULTI-PULLEY.

PATENT No. 27485/13 and 6612/14.

Is simple in construction. Nothing to go wrong. Fits any standard belt-driven machine. Just half a turn of the handle changes from top gear to free engine. So simple. Starts you like a car. The low gear gets you through traffic. The high gear saves fuel and gives you speed. The middle gears are there when you want them. The price, complete, for Triumphs, Bradburys, etc., is £3 3s. Ball-thrust model, which we recommend, £4. Light-weight models from £2 10s. Recessed pulleys, 10/- extra. Postage 2/- extra. Delivery from stock. Write for Catalogue.



Pulley fitted to machine.

WRITE TO-DAY  
for *Illustrated*  
*descriptive*  
*Literature.*

**GRADO MANFG. CO.**

Presto Buildings,  
Persnore Street,  
BIRMINGHAM.

### Testimonials.

Middlesbrough,  
Sept. 17th, 1917.

"I have got it (the Vaporiser) fitted on a De Luxe T.D.C. 2½ h.p. Cycle and have found it very efficient, doing 90 miles to one gallon of paraffin."

Gloucestershire,  
August 13th, 1917.

"I am writing to tell you that the Vaporiser I had from you has been very satisfactory, as I have been 200 miles and I have had no trouble whatever; I have given your lists to the Motor Garage here. I never spent 35/- better in my life than when I bought the Vaporiser from you. I run on an average of 70 miles per gallon on pure paraffin. I am more than satisfied with it."



## MILITARY NOTES.

Experiences in the Tanks; Separate Corps for Despatch Riders.

## MEMENTO FOR RELATIVES OF THE FALLEN.

THE War Office states that progress is being made with the scheme for presentation of a memorial plaque to the next-of-kin of officers and other ranks who have fallen in the war. In addition to the plaque, a scroll with a suitable inscription will be given. This is being designed at the present moment, and it is hoped that it will be possible to put the printing in hand in less than a fortnight.

## "PRO PATRIA."

WE regret to announce that Sec.-Lt. W. E. Grew, of the Royal Warwickshire Regiment, was killed in action on October 7th. He enlisted in the Artists' Rifles in July, 1916, on attaining the age of eighteen, and was trained at Romford, after which he obtained a commission in the Royal Warwickshires. This young officer was the second son of Mr. W. F. Grew (who has for many years been connected with *The Motor Cycle*). Mr. Grew has our deepest sympathy, and that of our readers, in his great bereavement.

## WHY NOT A D.R. CORPS?

BILLIE PRATT, at one time an exponent of the P. and M. machine, writing from France, says: "*The Motor Cycle* still reaches me spasmodically, and is always much sought after. The price up here for the *M.C.* is 'cinquante centimes'; a price we cannot always afford, unless it is on a pay day, and I can assure you it goes the rounds when a copy is luckily procured.



Lt. E. E. Elwell, who was killed on the 7th of this month on the Western Front. The photograph shows him at Brooklands about to compete for the thirteenth long motor cycle handicap on August Bank Holiday. 1913. Elwell won this race easily by forty yards from a field of forty-one competitors.

"In my humble opinion this particular branch (the M.M.G.S.) was a doomed disappointment from its birth to be used and equipped on any large scale, owing in some cases to its unwieldiness and other times to ground conditions. But, still, the Army got the men, and that, I suppose, is all that matters. In my opinion it is a pity that the authorities have never recognised the D.R.'s in any signal way, i.e., made them a corps of their own, now that they have the material at hand on which to work. As you know, the majority are now in the R.E. For what reason it is difficult to understand; they say it is because they do 'signal' work. Granted, but could they not do the work just the same from their own corps? For example, I believe the proper course is: If you want a clerk in the Army, you apply to 'K' Co., A.S.C., and get a capable man; but, so far as I can see, under existing arrangements anyone takes on the job of a D.R., to the detriment of what might be more efficient service and a considerable saving of time, labour, and expense to the country."

## THE LATE LT. E. E. ELWELL.

ANOTHER well-known motor cyclist has made "the great sacrifice," and we learn with very great regret that Lt. E. E. Elwell, a member of the firm of Messrs. Edward Elwell, Ltd., Wednesbury, was killed on the 7th inst. on the Western Front.

Lt. Elwell joined up in August, 1914, as a despatch rider, and in 1915 was granted a commission in the 21st Manchester. He took part in a number of Tourist Trophy Races and numerous other competitions, and performed brilliantly, chiefly on a 2½ h.p. Douglas, on which make he finished seventh in the 1914 Junior T.T. He was a member of the B.M.C.R.C. and B.A.R.C., and was the winner of many valuable cups and medals. He was very popular with the staff of his firm, and was equally so with his fellow competitors in the competitions in which he participated.

## CAPT. A. M. LOW'S TRANSFER.

WE learn that that brilliant scientist, Capt. A. M. Low, R.F.C., has been given the temporary rank of Lieutenant-Commander in the Royal Naval Volunteer Reserve, previous to his being given employment in a fresh capacity.

## A WOOLWICH MOTOR CYCLIST'S EXPERIENCES IN THE M.M.G.S. AND TANKS.

J. A. HOULT, of the Woolwich Club, a Six Days English and Scottish gold medallist, was home on leave recently. He enlisted in the M.M.G.S. early in 1915, and has been serving in the Tanks since their inception.

Hoult stated that he had been through some of the hottest fighting as a machine gunner and also on the Tanks without a scratch, though on two occasions on the latter he was in a tight corner, and some of the men were killed and injured beside him.



Cnr. J. A. Hoult, Tank Corps.

At the outbreak of war he was charge hand at a Clyde firm, which had just fitted up the s.s. *Aquitania*, and he gave up a lucrative post and a promising career to join the M.M.G.S. Although his firm recently made arrangements for him to return to his former post, Hoult declined to leave the Tanks.

One of the best known members of the Woolwich Club, Hoult drove a Matchless in some of the last open competitions. He was formerly employed at the Thames Ironworks and Merryweathers, Greenwich, and for two years served as a marine engineer.

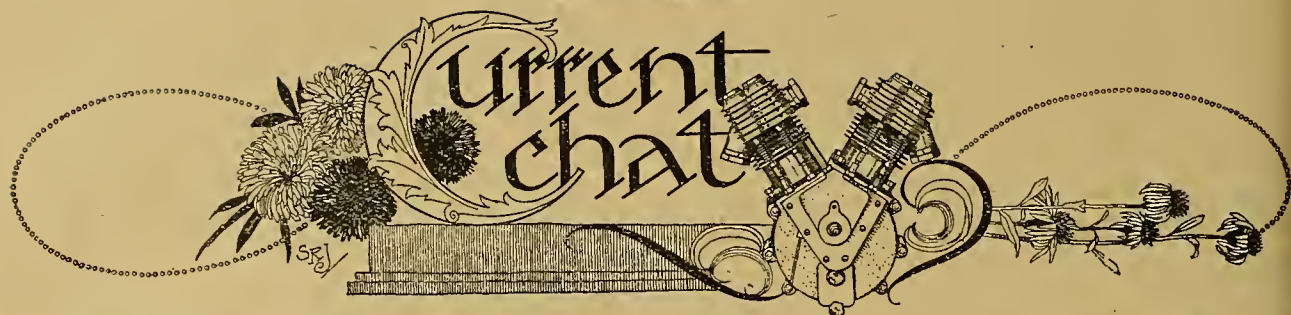
## ROADS IN PALESTINE.

LANCE-CORPL. HOGG writes from Palestine, and comments on the riding conditions that prevail in that country:

"I quite agree with 'Milk and Honey' in his letter appearing in your issue of June 28th. I have never been in France, but it appears to me that nothing could be much worse for riding than the roads (save the mark) out here. They are usually inches deep in dust or sand, and the D.R. has a job I do not envy. He manages, however, to get through it somehow, occasionally with some marvellous trick cycling.

"The machines are invariably Triumphs, and they appear to thump along a treat through the dust. These are the only machines I have seen in Palestine, although Douglasses are very much in evidence at the bases. I am an infantry man, but I very much admire the way the D.R.'s get along here, and resent the rather common sentiment that 'Anywhere but France is a picnic.'"





## TIMES TO LIGHT LAMPS.

GREENWICH TIME.			
Oct. 25th	...	...	5.16 p.m.
" 27th	...	...	5.12 "
" 29th	...	...	5.8 "
" 31st	...	...	5.4 "

## Petrol Imports.

The quantity of petrol imported into England during September was the highest recorded for any month during the year.

## Economy in Petrol.

With a view to stricter economy in petrol, local committees are to be set up to co-ordinate the means of road transport. This will affect retail distribution, and the Food Controller therefore asks the public to do their shopping within a reasonable distance of their homes.

## The Motor Spirit Restriction Order.

Police officers have received instructions throughout the country to stop any car or motor cycle which they have reason to suspect is being employed contrary to the regulations, which come into force on November 1st. The roads to and in the neighbourhood of certain fashionable seaside and inland watering places will receive special attention. When cars and motor cycles are seen outside restaurants, hotels, and theatres it is likely that the police will question their drivers. The onus of proving whether cars and motor cycles are or are not being legitimately used will not rest upon the police, but upon the driver of the vehicle.

## A Swedish Motor Bicycle.

There are still a good many countries in Europe which do not manufacture motor bicycles. One of these, up to the present, has been Sweden, but we know of a young Swedish engineer who was over in this country last Christmas for the purpose of devoting his attention to studying the design of English machines.

We have just heard from him to the effect that he is head of the motor cycle department of a firm manufacturing small arms in Sweden. He points out that they intend to build the whole machine, and they are the first Swedish firm to do so. So far as possible they are following British ideas throughout, but the Swedes have learnt certain facts from the numerous competitions they have held over their bad mountainous roads, and, in consequence, the design will be modified to some extent to suit the conditions of that country. He also points out that the British machines made for the Russian Government are very closely allied to the ideal Swedish motor cycle.

## Lost Gold Rings.

One of our staff was recently proceeding along the Portsmouth Road and happened on a gold ring, picked it up, and advertised in *The Motor Cycle* the fact that a ring had been found.

The following week he received no fewer than four enquiries from readers of the paper who had actually lost gold rings. There is no doubt that these letters were quite genuine, but, unfortunately, not one of the descriptions given could be said to refer to the ring which had been found.

## The Date of Second-hand Machines.

A correspondent, Mr. J. R. C. Richards, in a recent issue of *The Motor Cycle*, mentions the case of a friend of his giving the engine number of a certain make of machine to the makers and applying for the date of manufacture, only to receive a reply to the effect that "they only give the date to the original purchaser." We sincerely hope that there are very few motor cycle firms who withhold this kind of information, as the engine number is probably the only means by which the novice-purchaser may save himself from fraud, and we therefore trust that this paragraph will catch the eye of the firm to which our correspondent referred.

## SPECIAL FEATURES.

## OVERSEAS COMMENT.

## MECHANICS FOR THE MOTOR CYCLIST ENVIRONMENT AND THE OVERSEAS MACHINE.

## U.S. Flying Corps requires 47,000 Motor Cycles.

An American contemporary states that with the proposed 22,000 aeroplanes in use there will be required approximately 43,000 lorries, 13,000 passenger cars, and 47,000 motor cycles. The total number of motors used in this one division of the army will be close on 125,000—a quantity destined further to emphasise the present petrol shortage.

## A Doubtful Headline.

Reading an American motor cycle paper the other day we noticed a headline, "Thinks He Has Stolen Machine." At first glance it occurred to us that the gentleman referred to must have a very poor sort of conscience if he could not make up his mind whether he had actually stolen the motor bicycle or not, but after reading the paragraph we learnt that a certain reader of the journal in question reported that he had come into possession of a 1916 Indian which he believed had been stolen by somebody.



THE MOTOR CYCLE IN CUBA.

Although motor cycling is not indulged in to any great extent in Cuba, there are a few enthusiasts to be found. The photograph shows a two-speed twin Pope in the neighbourhood of Cienfuegos.



**New Work for Disabled.**

Skilled, disabled soldiers, it is intimated, are employed at a Beckenham (Kent) motor works specialising in coal gas conversions of motor vehicles.

**Motor Cycling Engineers. Petrol Licence Surprise.**

Some of the motor cycle engineers at Woolwich and Crayford have had an unexpected surprise this week in the shape of renewal licences in half-gallon coupons. It would appear as though this concession is being granted only to men living in the outlying and inaccessible districts. Those who made this declaration on their applications have excellent reason to congratulate themselves.

**Position of Town Dwellers.**

Those living at an equal distance from their work in the London area are not so fortunate. Woolwich has a notoriously indifferent rail service, and the trams and buses are totally inadequate. At the same time it is in easy access of the healthier country residential districts, and it is mainly owing to motor cycles that some workers are enabled to live so far afield. The Petrol Controller should consider the town dwellers, who above all need an occasional run into the country in their limited spare time.

**Experiences with a Gas Trailer.**

We had a demonstration one day last week on one of Cox's gas trailers attached to a 1916 8 h.p. Royal Enfield and sidecar, which is the property of Messrs. Rider Troward and Co., 31 and 78, High Street, Hampstead, London. N.W.3, who have been appointed sole agents and concessionaires for this attachment.

The engine was practically cold at the time the trailer was fastened on to the machine, and we were especially pleased to note that it started with great ease after the correct adjustment for the gas had been found. The machine ran satisfactorily and pulled well, and, in fact, one could hardly tell the difference between gas and petrol.

The bag, which contained sufficient gas for a run of twenty-five miles, can be

charged off an ordinary gas meter in twenty minutes.

The makers claim that coal gas gives more power than petrol, which is curious in view of the fact that most people agree that the reverse is the case. However, we hope to be able to give our readers further information on this matter in the near future.

**On Behalf of the Discharged.**

We are informed that our contributor, Mr. Charles G. Harper, has offered his services to the Committee for the Employment of Discharged Soldiers and Sailors connected with the motor industry. Mr. Harper is to act in an honorary capacity for the purpose of writing descriptive paragraphs dealing with the work of the committee as things of interest arise.

**The Coal Gas Problem and Profiteering.**

The prices charged for certain gas containers are very much inflated. In one instance a gasbag with its necessary impedimenta, which, from our certain knowledge, costs the producers less than £7, is marketed at over £20, and, this sort of profiteering is sufficient to kill the whole thing in its infancy. If those concerned are content to charge reasonable prices they should see satisfactory returns, for there is certainly a possible future for coal gas—at any rate, for industrial vehicles. Profiteering will merely hamper and retard its development, and at a time, too, when those interested might prosper.

**A Comfortable Sidecar.**

We recently had the pleasure of a couple of rides in a Gloria sidecar fitted to a 6 h.p. twin. This was a most delightful outfit; the sidecar was excellently sprung and very comfortable, while the machine was possessed of ample power and speed. The sidecar was equipped with an extra seat to carry a child, which still left ample room for the other passenger.

**Coal Gas.**

This fuel offers several advantages over petrol. Cold weather will not affect the ease of starting, and if the fuel be properly applied no faltering should result from mishandling the throttle lever—as so often occurs with petrol. This faltering, on suddenly opening the throttle, is generally owing to condensation in the induction pipe, which, of course, cannot occur with coal gas. It is a curious fact, however, that even with coal gas a hot air intake is advantageous.

**The Application of Coal Gas.**

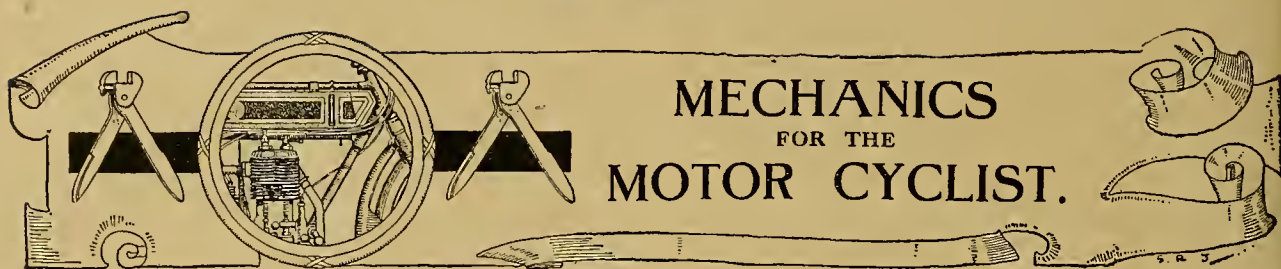
For the benefit of our readers we have decided to conduct a series of experiments and road tests of the various methods at present in vogue for the application of coal gas to motor cycles. These experiments are to be of a very thorough nature, conducted by practical members of our staff, and undertaken with a view to ascertaining the most useful methods of adapting motor cycles to the changed order of things.

**B.S.A.'s IN GERMANY'S LOST COLONY.**

(Top) A batch of 150 B.S.A. motor cycles used by the South African Motor Cycle Corps at Kilossa, German East Africa.

(Bottom) Ready for a trek. The native straw hut on the right is used as a temporary store by the corps.





## MECHANICS FOR THE MOTOR CYCLIST.

### Sixth Instalment. POWER AND EFFICIENCY.

(Previous instalments appeared on July 19th, August 9th, August 23rd, September 20th, and October 4th.)

**P**OWER.—In ordinary use the term "power" has a very wide and ill-defined range of meanings, though it generally conveys the idea of strength or force. In mechanics, however, the term has a very restricted application; it is used solely to denote the *rate* of doing work—that is, to define the amount of work done in unit time. When discussing the suitability of any source of energy for a given purpose we not only want to know *how much work* it is capable of giving out, but also *how quickly* it can do it. One man could haul a loaded motor 'bus to the top of Highgate Hill—if you gave him the necessary time and tackle. A petrol engine does no more work than the man in propelling the 'bus up the slope, but it does the work more quickly—it performs more work in unit time—hence, we say its power is greater.

#### Horse-power.

The unit of power is the horse-power. Energy is given out at the rate of one horse-power when 33,000

foot-pounds of work are done per minute. We can therefore calculate the horse-power of any source of energy by dividing the number of foot-pounds of work done per minute by 33,000.

It will be interesting to compute in this manner the horse-power absorbed in propelling, say, a sidecar combination up a 1 in 10 gradient at a speed of 15 m.p.h. In one minute the distance travelled along the road will be 1,320 feet, hence the vertical height through which the combination is raised will be  $1,320 \times \frac{1}{10} = 132$  feet. Taking the total weight of the combination as 600 lb., the work done per minute against gravity alone is  $600 \times 132 = 79,200$  foot-pounds. Consequently, the horse-power expended in over-

coming gravity is  $\frac{79,200}{33,000} = 2.4$  h.p. To obtain the total power output of the engine we have to add to this figure the power absorbed in frictional losses in the transmission and at the road wheels.

Another calculation which will help to show the relation between force, speed, and power is that of chain tension. Let us assume that the machine which formed the subject of the preceding example was all-chain driven, the diameter of the rear wheel sprocket

being 9in., and the total horse-power transmitted through the chain being 3.5. With 26in. tyres the chain speed will be  $1,320 \times \frac{9}{26} = 456$  feet per minute (assuming as before a road speed of 15 m.p.h.). Now the number of foot-pounds per minute transmitted through the chain is  $3.5 \times 33,000 = 115,500$ , therefore

$$\text{since Force} = \frac{\text{Work per minute}}{\text{Distance per minute}}$$

the chain tension is  $\frac{115,500}{456} = 253$  pounds.

It should hardly be necessary at this stage to remind the reader that the figure which expresses the h.p. of a motor cycle is a purely arbitrary one, for the actual expenditure of energy takes place at constantly varying rates, depending on speed, gradient, etc. It is only on very rare occasions that a machine of  $3\frac{1}{2}$  nominal horse-power develops precisely  $3\frac{1}{2}$  h.p. Usually the power output is less than this figure; occasionally it is more.

**Efficiency.**—To the scientific mind the lax and indiscriminate use of the word "efficiency" used formerly to be distressing; but since the days when such terms as "barrage" and "camouflage" began to besprinkle our newspaper columns, the word in question has been so overworked that even the most sensitive pedant must have become hardened to its misuse. The adjective "efficient" conveys the idea, when applied to an individual, of competence or

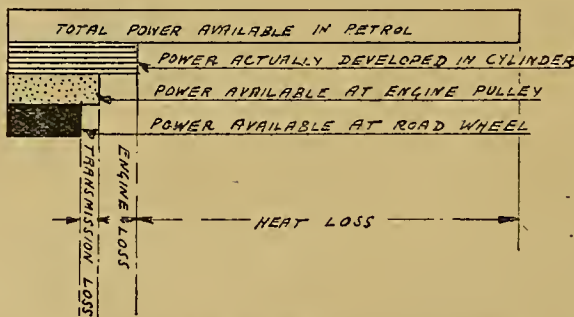


Diagram showing power losses in motor cycle mechanism.

ability—an efficient officer is, in brief, one who does his job properly. Now an inefficient officer may be inefficient either because he does not work hard enough, or because, although he slaves at his task with the utmost devotion, his energies are misdirected; that is, only a certain proportion of the energy he exerts is productive of useful work, the remainder being wasted. The technical use of the term "efficiency" is, or should be, confined to the latter aspect of the question. The efficiency of any source of power is simply the *percentage* of the total power developed that is effectively employed; the actual value of the horse-power does not concern us.

In calculating efficiencies, our first step must be to define exactly what we mean by "total power developed" and "power effectively employed." Thus,



**Mechanics for the Motor Cyclist.—**

regarding the engine only of a motor cycle, the total power developed is that produced by the pressure of the ignited petrol vapour on the piston, *i.e.*, the "indicated horse-power," while the power effectively employed is that given out at the pulley, as registered by a fan or other brake, *i.e.*, the "brake horse-power." Owing to the waste of energy entailed in overcoming the friction of the moving parts of the engine, the second quantity is always less than the first; hence the ratio  $\frac{\text{b.h.p.}}{\text{i.h.p.}}$ , the so-called "mechanical efficiency" of the engine, is always less than unity. The precise value of this fraction varies according to the class of engine, etc., but it is usually of the order of 60% or 70%.

**Overall Efficiency.**

If now the motor cycle be considered as a whole, a different meaning must be attached to the expression "power effectively employed." From the rider's point of view; the only power that is effectively utilised is that which actually serves to propel him and his machine along the road—in brief, the power delivered at the road wheel. This horse-power will certainly be less than the b.h.p. of the engine, on account of frictional losses in the transmission—chain or belt, gear box, etc.—so that the overall efficiency of the motor cycle will be materially below 70%. In other words, at least one-third of the power developed in the engine cylinder is wasted, serving no useful purpose whatever.

**Thermal Efficiency.**

One other aspect of the subject deserves notice, if only because of the healthy effect a reference to it should have in reducing to a suitably humble frame of mind those who are too prone to plume themselves on the present state of perfection of the motor cycle engine. Considered as a heat engine, even the most "super-efficient" power unit is a melancholy failure, for it only converts about one-fourth of the heat supplied to it into useful work, or, in technical language, its "thermal efficiency" is 25%. Just as mechanical efficiency relates to the ratio between power usefully employed and total power supplied, so thermal efficiency is the ratio between heat usefully employed and total heat supplied. The heat usefully employed is that which is converted into effective work, and can be calculated from the known b.h.p. of the engine, while the gross quantity of heat supplied can be computed from the calorific value of the petrol. As stated, this ratio is at most 25% or so. Some such result as this would naturally be expected when it is realised what immense quantities of heat are thrown away in the exhaust gases and lost by radiation from the cylinder, though it is only fair to add that "Nature's stern decrees" forbid any material reduction in these losses. For we must get rid of the heat for the sake of the working parts.

Reference to the diagram on the preceding page will emphasise the importance of the losses which accompany the transformation of energy in a motor cycle.

MOHANDIS.

(To be continued.)

## MONOCAR DESIGN.

### A Reader's Idea on the Subject of Three-wheel Monocars.

THE suggested monocar in *The Motor Cycle* for September 27th is interesting, but "Mono" has set himself a difficult task to enclose all the parts as he has shown. Presuming there is a demand for a monocar, why cannot it be met by the makers of existing machines? and why should the monocar be a four-wheeler and so come under car taxation?

Enthusiasts of monocars once thought that the advent of the Morgan would give us what we required. Instead of that it has been developed for the benefit of those who have money and require speed, and the craving for speed has not benefited motor cycling in the least. A 4 or 5 h.p. single-seated Morgan would be an attractive proposition, especially if the weight were kept down and the two-speed were altered to a three-speed gear box, with one chain only to the rear wheel.

The accompanying drawing is a suggested simple three-wheeler. The frame is made of two ash boards

suitably stayed at the corners, the engine being carried by two cross tubes. The sloping front and the bottom are boarded in, also the top of frame under magneto, a metal cover fitting over that portion of the crank case that projects. The ball bearings for the countershafts are carried in cages bolted through the ash

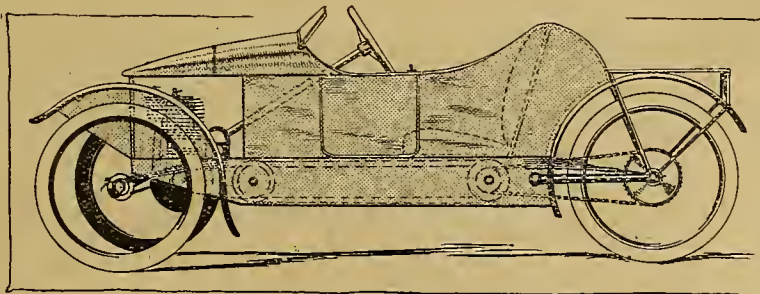
boards. Either one or two bolts can be used, but I can see difficulty in getting a suitable gear box owing to the length of the countershaft.

With a single belt I do not see why two expanding pulleys should not be fitted after the style of the old L.M.C. Auto - varia, but fitted with two metal

rollers so that as one expanded the other contracted, or *vice versa*.

This would give a fair range of speed, and there would be no slack belt. The front portion over the engine is simply a cover to contribute towards the streamline effect and is hinged to give access to the valves.

A.G.



A three-wheeled monocar designed on very simple lines.





## "PUSHER OR TRACTOR?"

By W. G. ASTON, A.M.I.A.E.

**A**N aeroplane in which the air screw is placed behind the main planes is commonly called a "pusher." Where this disposition is reversed it is called a "tractor." Both types of machine exist in large numbers, although the pusher is not so prominent as it once was, and the question may therefore well be asked, "If one is demonstrably better than the other, why should there be more than one type?" The answer is that there is much to be said for both, and that, consequently, it would be very unwise to say which will eventually supersede the other, the probability being that for some time they will exist side by side until some definite step forward in aeroplane evolution has been attained.

It has often been said that the tractor has this great advantage, that the planes get more lift through working in the slip stream of the air screw. This is more or less true, but it is a question whether the advantage so gained is not neutralised by the fact that the resistance of the wings, struts, etc., immediately behind the screw is proportionately increased. On the other hand, it has been claimed for the pusher that since the screw is working in air which is being dragged forward—to a certain extent—by the planes, its efficiency is thereby increased. This, however, is quite fallacious, and a little thought will show that as the whole propulsive effect must come from the screw it cannot possibly gain anything from the resistance of the planes. If such were the case an indefinitely high efficiency in the screw could be obtained by putting it behind ill-designed planes which dragged a lot of "dead air" with them, which is, of course, absurd.

### Cooling the Engine.

Aerodynamically, the two types may be said to be equally good except for the resistance of the bodies. In the pusher the passenger will be in front and the engine behind, consequently the body cannot be tapered progressively off towards the tail as it can be in the case of the tractor, unless the engine is put some distance in front of the screw and a shaft employed for transmitting the power. From the engineering point of view this is undesirable, as it leads to a considerable increase of weight.

In the tractor the wings are simply wings and have no other function to perform: they can consequently be made slightly lighter than those of the pusher, in which the central portions of the wing spars have to provide a rigid and strong framework to which the outriggers carrying the tail can be attached.

Again, still looking at the two machines from the engineering point of view, it is more difficult to employ an air-cooled engine in the pusher, as the engine is in front of the propeller, and this will necessitate a power-driven fan for providing the required high-speed draught over the cylinder heads. Even if a water-cooled engine is installed the radiator will not be able

to be placed in the slip-stream of the screw, and will therefore need to be larger, and in consequence heavier and of greater resistance. This matter is of special importance, since the greatest cooling effect is required when the machine is climbing fast and therefore travelling forward at a comparatively low speed.

### Simple Control Wires.

The tail control wires are more easily installed in a tractor than in a pusher, since in the latter case they have to be taken first along the wings and then back down the outriggers to the rudder and elevator. Unless they are completely hidden in the wings—which is not particularly desirable—the pulleys for this purpose will offer a not negligible amount of resistance, whilst, of course, the weight of the wires is considerably increased.

In a pusher, the mass and position of the engine renders it rather difficult to get the centre of gravity sufficiently far forward. As a result, in most pushers the centre part of the trailing edge of the planes has often to be cut away to provide space for the screw. This slightly reduces lift if the drag is to remain the same, or alternatively increases the drag for the same lift.

One small advantage which the pusher has over the tractor is this, that the screw is better protected against breakage, but it is doubtful whether this point is worth serious consideration, as it practically only applies to a case in which the engine is being run whilst the machine is held back by chocks. In this event the tail of a tractor must be held down—if let go the machine is liable to swing over and put its nose in the ground.

### The Convenience of the Pilot.

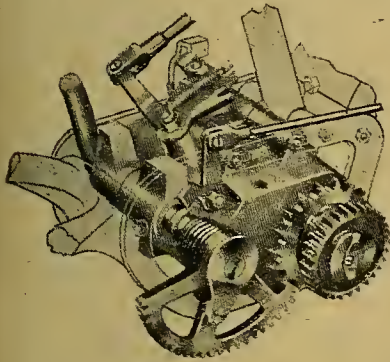
From the pilot's point of view there is a good deal to be said for the pusher. First of all he is not sitting in the slip-stream of the screw, and his position, in addition to being less blown upon, is also a little less noisy, the air striking his ears before it gets its load of clatter from the engine. Again, he is furnished with a completely unobstructed view of the ground below and in front of him, and therefore without straining to look over the side of the body, as sometimes has to be done in the case of a tractor, he can make a very carefully judged landing without any trouble at all. On the other hand, it has sometimes been said that in the case of the tractor the pilot has a fairly long body in front of him by which his steering, etc., are facilitated, as he can use the nose of the body in the manner of a rifle sight. This contention seems to have but little foundation in fact; in any case, it is at least neutralised by the previous consideration, and there is certainly no more difficulty in flying the one type of machine than there is in the other.



# AMERICAN EXCELSIOR FOR 1918.

Detail Refinements and  
Improved Finish for Military  
Models.

THE American Excelsior 7-10 h.p. twin for 1918 is known as the military model, and several refinements and innovations have been made in accordance with the progress of American design. It will be recalled that Excelsior models of the past have been rather remarkable for wide expanses

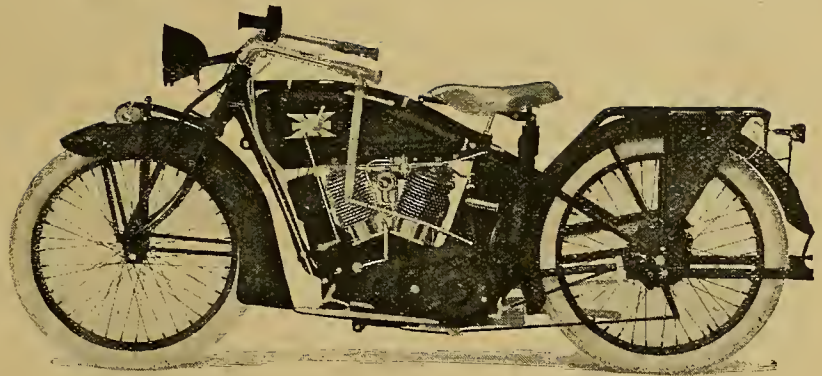


The Excelsior kick starter automatically lifts and releases the valves when starting the engine.

of plating, which required some attention during wet weather riding if their virgin lustre were to be retained, and it is therefore rather refreshing to observe that the new model presents a more businesslike exterior. Many of the highly polished parts have been abolished, the general finish being in olive drab for military requirements, the handlebars, controls, and some of the engine parts only being plated. In the case of the rims and spokes, the enamel is applied over a heavy coating of nickel, which we consider an excellent plan.

## Engine and Transmission.

No changes noticeable to the ordinary rider have been made in the power unit, though a new and very much improved design of clutch is now employed. In past designs the main clutch bearings have been integral with the body of the unit, so that worn bearings necessitated expensive and otherwise unnecessary renewals; but in the new design these large bearings are mounted independently, and can be renewed at small cost and without difficulty. Adequate provision is made for lubricating these bearings, and the Raybestos-lined friction surfaces of the clutch are of increased area, thus affording longer life and sweeter engagement. The clutch is so designed that an excess



The latest model Excelsior, fitted with Widco electric system and magneto generator. The size of the engine is  $84.5 \times 88.9 = 998$  c.c.

of lubrication cannot affect its gripping properties. Adjustments are external, it being necessary only to remove the dust cover by taking out one large screw.

No alteration has been made in the three-speed gear, the original interconnection between the clutch and the gear striking mechanism being retained, so that it is impossible to move the gear lever without declutching. A large spring shock absorber is contained in the rear wheel sprocket, and this is claimed to assure a unique sweetness of drive, though our own experience of this type of shock absorber has not always assured us that nothing better can be arrived at.

Both brakes act on the rear wheel, being respectively internal expanding and external contracting. They are operated by pedals, one on either footboard. To the left foot of the rider is the internal expanding brake pedal, which also controls the clutch. The first movement of the pedal disengages the clutch, and a further application brings the brake into engagement—an arrangement which offers some commendable points in the case of a heavy sidescar machine.

The "step starter" remains unchanged, but it may be well to recall one interest-

ing point with regard to this mechanism, whereby the rider is relieved of the task of using his exhaust valve lifter in exact unison with the pedal. The first downward pressure of the lever lifts the valves, which are allowed to fall at the end of the stroke, and the makers claim that by this arrangement ease in starting is assured.

## Improved Tank.

The more noticeable changes include a new type of "gasolene" tank, a separate oil tank, and new tool bags. Two models are produced, as previously—the electrically equipped and the magneto model. In the electric model the batteries are housed in a compartment in unit with the oil tank under the saddle, and in the magneto model this space is occupied by the kit. Lubrication is mechanically operated, but an auxiliary hand pump is provided.

The front forks have been strengthened, a stiffer spring having a larger scroll containing a large rubber block being used.

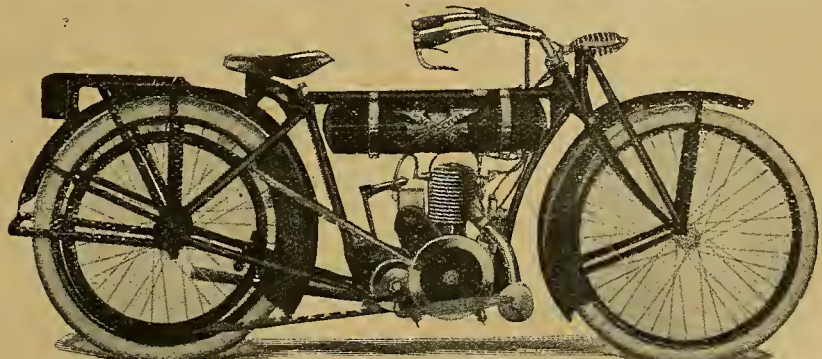
## A Frame Innovation.

A feature of the Excelsior frame is the removable centre bar. The horizontal bar running under the petrol tank is provided with locking joints and cross bolts at its extremities, so that by removing one or two minor connections this bar, with tank attached, can be carried out of the frame, giving perfect access to the engine, and permitting the removal of the cylinders for decarbonisation.

The two-stroke lightweight model Excelsior remains unchanged for 1918.



The "Kushion" sprocket was a 1917 innovation, and is a device for equalising the impulses of the engine.



The Excelsior 1918 model two-stroke. The design strikes one at the first glance as being much like the Triumph.



# TRADE IN SOUTH AFRICA.

## AN OPTIMISTIC OUTLOOK.

CONSIDERABLE misapprehension appears to exist in many quarters as to how far the British share of the trade with South Africa in cycles, motor cars and motor cycles, power lorries, and other vehicles has been hit by the war. That it has severely suffered so far as motor cars and lorries are concerned was only what might have been expected, in view of the never-ceasing demands of the military authorities on the various fronts. But it cannot be said that the trade in cycles and motor cycles has suffered in anything like the same proportion, and to permit of a clearer understanding of the position we have drawn up a table showing the value of all vehicles imported into the Union of South Africa in the past four years and for the first five months of 1917. We have purposely omitted the value of the Rhodesian imports, because some go through the Union ports and others *via* Beira, thus rendering it impossible to determine whether some of the Union totals do not relate to in-transit goods to Rhodesia. Taking the figures for the Union Provinces only, it will be seen that the United Kingdom's share of the trade in motor cars and parts dropped from £436,795 in 1913 to £66,828 in 1916, and in power lorries from £24,002 to £4,606, although it is not altogether unsatisfactory in the conditions prevailing, both as regards manufacture and freights, that the shipments should have been maintained at the level shown in the table.

### The Cycle and Motor Cycle Trade Practically British.

So far as cycles and parts are concerned, the value of the Union imports

from Great Britain dropped from £208,185 in 1913 to £112,370 in 1916, or nearly one-half, although this figure is materially in excess of that for 1915. But what must be regarded as distinctly encouraging is that of the total of cycles and parts imported into the Union last year—£116,988—no less than £112,370 were supplied by United Kingdom manufacturers, only

is in the supply of motor cars and parts and in power lorries where the manufacturers of other countries, and particularly those of the U.S.A., have temporarily captured the market. So far as cycles are concerned, none are locally manufactured in South Africa, although the practice of assembling parts and putting them together locally is becoming fairly general, even in the case of well-known makes. Germany was the largest competitor with Great Britain in this trade, although enemy shipments were of no great value. Cycles and parts from Japan first figured in the import figures in 1916, but the trade was quite insignificant, although those from the United States made some headway, as compared with the pre-war year.

### A Keen Struggle Expected for the Motor Trade.

As a matter of fact, with the complete figures before us, the surprise is that the trade remains as large as it is. In any case, there is not the slightest reason to suppose that when peace comes and tonnage is available, British manufacturers of cycles and motor cycles will not easily regain the position in the South African market which they have temporarily lost; but whether this will be the case with motor cars is quite conjectural. With the U.S.A. types of cars now firmly established there, it is obvious that there will be a keen struggle for supremacy between the manufacturers of the two countries when the days of peace return and they are free to devote their energies to other things than the instruments of destruction.

—From the "British South African Export Gazette."

### IMPORTS INTO THE UNION OF SOUTH AFRICA.

	1913.	1914.	1915.	1916.	First Five Months, 1917.
<b>Cycles and Parts</b> .....	£229,809	£158,309	£71,159	£116,988	£21,002
From United Kingdom	208,185	145,709	68,631	112,370	—
" other countries .	21,624	12,600	2,528	4,618	—
<b>Motor Cycles and Parts.</b>	223,524	163,863	111,632	162,612	57,549
From United Kingdom	201,378	143,560	75,678	107,705	—
" other countries .	22,146	20,303	36,554	54,857	—
<b>Motor Cars and Parts</b> ..	1,100,867	753,726	463,427	769,541	289,719*
From United Kingdom	436,795	325,793	90,115	66,828	—
" other countries .	664,072	427,933	373,312	702,713	—
<b>Power Lorries</b> .....	35,953	26,735	24,932	30,883	3,134*
" United Kingdom	24,002	14,619	5,230	4,606	—
" other countries .	11,951	12,116	19,702	26,277	—
<b>Perambulators</b> .....	12,384	10,450	12,702	18,506	—
From United Kingdom	8,814	8,125	8,354	12,295	—
" other countries .	3,570	2,325	4,348	6,211	—
<b>All other Vehicles</b> .....	65,162	52,920	23,754	27,325	11,032
From United Kingdom	12,591	14,587	1,873	1,459	—
" other countries .	52,571	38,333	21,881	25,866	—
<b>Total</b> .....	1,667,699	1,166,003	707,606	1,125,885	456,594
From United Kingdom	891,765	652,393	249,281	305,343	—
" other countries .	775,934	513,610	458,325	820,542	—

\* Exclusive of £74,158 for parts of Motor Cars and Power Lorries.

£4,618 worth having been shipped by other countries. Indeed, as the table clearly shows, this trade has always been in the hands of British firms, and the same remark applies to motor cycles and parts, although the imports of these from other countries than England show a steady improvement in value ever since 1913. Nevertheless, the British share of the trade was maintained in 1916 at £107,785, as against £201,378 in 1913. It

## "CANNONBALL" BAKER AND THE COAST-TO-COAST RECORD.

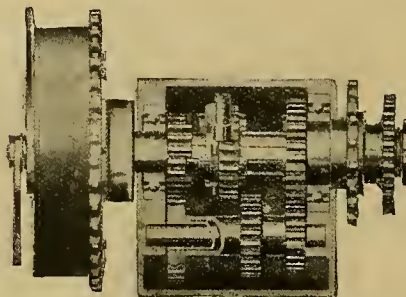
UP to the time of writing no news has been received with respect to "Cannonball" Baker's attempt to regain the coast-to-coast record. It will be remembered that Baker, on May 3rd to the 14th, broke all records from New York to San Diego on an Indian, this in turn being smashed by Alan Bedell on a Henderson. Baker's old record for the 3,378 miles was 11 days 12 hours 10 minutes, Bedell beating it by nearly four days, his time being 7 days 16 hours 16 minutes.

### Baker's Checking System.

Baker's friends had hopes of Bedell's figures being cut down by a day, but Baker himself was non-committal, for so much depends on the weather, a few days wet weather being sufficient to spoil all chances of making new time.

One of the interesting features of Baker's plans for the present record trial

is his checking system. He has made out a complete set of postcards to cover the cities and towns at which he will touch, and at each stop one of these cards will be filled out by a reliable



The three-speed gear box and new dry-plate type clutch fitted to the 1918 American Excelsior (see page 405).

party, and mailed to Baker's manager, at Indianapolis. These records will be turned over to the chairman of the F.A.M. Competition Committee, when the trial is over. In the past Baker lost considerable time in having his book checked up at the various stopping points, and he believes that the postcard idea will be much simpler, and at the same time it will absolutely guarantee the validity of his performance.

### U.S.A. MOTOR CYCLE MAKERS AND THE GOVERNMENT.

MANUFACTURERS in America have submitted to the War Department the recommendation that a training establishment be formed for the purpose of training officers and men for the Service, to be maintained by the Government with joint co-operation by the motor cycle manufacturers.



## BIG TWINS IN FRANCE.

The question as to how the big American military motor cycles will meet the conditions in France is an interesting one, and many opinions are being expressed on the subject. Until they have "been through it" it is unsafe to prophesy that the riders will find the advantage of additional power very real, but there is no doubt the extra weight of the machine will be felt, especially when handled in such conditions as shown in the photograph.

OUR American contemporary, *Motor Cycle Illustrated*, commenting on this subject, says:

"In view of the recent debates in the Standardisation Committee of the Motor Cycle and Allied Trades Association concerning the types of army machines needed for service abroad, and the admitted inability of Washington officials to reach a decision with reference to the relative importance of light, medium, and heavy weight models, the accompanying photograph tells a valuable story. It gives unquestionable testimony of the conditions under which motor cycle courier and reconnaissance work is conducted behind the battle lines in France, and affords more definite and striking information than could be crowded into volumes of written matter. To a considerable degree it is an answer to the question that has been agitating American motor

cycle manufacturers ever since they were called into consultation with the nation's war chiefs on plans for equipping our motor cycle units.

"The picture, which was taken not far behind the British lines in France, shows a despatch rider about to start on a trip. Owing to the depth of the mud, he is being assisted by a German prisoner, while other captured Germans are to be seen in the background.

It is plainly evident that this motor cyclist is to have no pleasure jaunt, that the stamina of his mount and his skill as a pilot are to be tested to the utmost. He is using a  $3\frac{1}{2}$  h.p. Triumph, with chain-cum-belt transmission, and scaling something like 250 lb. These machines, while not used as widely as the Douglas for solo service in the British Army (accord-

ing to the best information obtainable), have given pretty general satisfaction. The Clyno, about 5-6 h.p., is looked upon as the British favourite for sidecar and machine-gun work. Both the British and French war chiefs experimented with numerous makes of motor cycles at the beginning of hostilities, but the British now limit themselves to two or three types and the French are following suit, with the idea of bringing about greater standardisation in operating and in repair work.

"Could the lightweight, as we know it, handle itself on such roads as appear in the photograph above? Would its relatively low weight, combined with medium power, be an advantage under such conditions or a drawback? Would the lightweight's greater facility in handling be offset in deep mud by the big twin's steady pull? Well, there's the picture. There is a story in it. How does it strike you?"



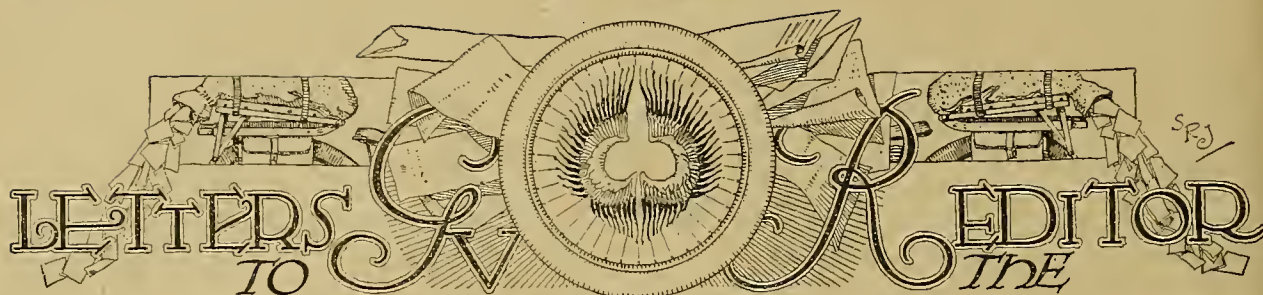
A despatch rider being assisted by a German prisoner in starting his motor cycle on what, for want of a better term, may be described as "a road behind the lines."

## OIL IN THE UNITED KINGDOM.

MR. LONG said last week that the Bill for making the provisions with respect to the search and boring for and the getting of petroleum in the United Kingdom was a very clear and simple one. What the authorities were concerned with was that if there were oil to be obtained in this country—at present they did not know that there was—it would be obtained as expeditiously and as cheaply as possible. The Bill would vest in the Crown the right and power to explore for oil and to fix a royalty to be paid.

It must be borne in mind at this moment that the possession of oil was more important than anything else. The experience of other countries taught that the moment the idea was started that anything like petroleum was found, the spirit of enterprise, competition, and speculation was aroused. In other countries immense sums spent in search for oil had been wasted. The object of the Government was to prevent anything of the kind from happening in this country.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### PETROL FOR SOLDIERS ON SHORT LEAVE.

Sir,—Regarding the new petrol restrictions which come into force on November 1st, I should like to point out that no allowance whatever has been made for officers and men of His Majesty's Forces posted in those commands where the use of the railway by troops not on duty is forbidden. Short leaves of under forty-eight hours are granted to officers and men provided they travel by road, which necessitates a motor vehicle—a motor cycle or light car is the usual conveyance, both of which are extremely light on petrol. This short leave means considerably more to soldiers than is realised by those differently placed, especially when one is shortly proceeding Overseas. After November 1st officers and men will be entirely cut off from their relations and friends, which seems to be an unnecessary hardship to impose on them.

The use of motor vehicles for this purpose cannot be classed and disparaged as "joy-riding" any more than going by train, which nowadays is the privilege of the civilian. It is simply a method of travelling, and though a keen motor cyclist myself, I must admit that riding in winter weather, especially at night, is anything but "joy." However, it is worth it for the sake of seeing one's relations and friends before going Overseas.

Surely some allowance should be made for those affected in this way, and a small allowance of petrol granted them for this purpose.

SUBALTERN.

Aldershot.

#### THE FUTURE OF GAS ON MOTOR CYCLES.

Sir,—I notice that certain technical journals seem to have recently gone gas mad. It does not appear to me that coal gas will ever be a successful rival to petrol as far as motor cycles are concerned. Gasbags are large and clumsy, and only a very small mileage can be obtained from one fill. The filling itself takes a considerable time compared with emptying a tin of petrol into the tank, and also gas does not give quite as much power as petrol. Cylinders containing gas under pressure do not seem to be much better, as one rider who recently fitted four fairly large cylinders to his lightweight could only manage to obtain between three and four miles from one charge. It is true that many motor cyclists are fitting gas bags to their machines at the present time, but that is only because petrol is absolutely unobtainable. But to state, as some of these journals do, that gas will be extensively used for the propulsion of motor cycles after the war is surely absurd. Petrol will be obtainable once more, and considerably cheaper than at present, and I cannot imagine any self-respecting motor cyclist going along with gasbags flapping about round him, or messing about filling cylinders every dozen miles or so.

The real and only sphere for coal gas appears to me to be for commercial vans and lorries which have more or less a fixed run within a certain district. With them appearance does not matter, and they will find gas considerably cheaper than petrol in the long run.

A. ARNOLD.

#### V TWIN SOLO MOUNTS.

Sir,—With regard to the recent controversy on solo mounts and the single v. the flat twin, I should like to give my experience with a type of mount about which very little has been said—I mean the  $3\frac{1}{2}$  h.p. V twin.

My motor cycle is a N.U.T., new in November, 1915, and fitted with an overhead valve J.A.P. engine. The petrol consumption is good and the starting easy, as with a fixed gear of  $3\frac{1}{4}$  to 1 I do not need to flood the carburetter.

B 20

The machine will do 60 m.p.h. on the road, and I recently averaged 30 m.p.h. on pure paraffin on a run of thirty-five miles. The roads were muddy, and four miles of the run were through tramlined streets, so I think it is quite a fair average.

As a solo mount I think it is ideal, as it runs as smoothly as any flat twin I have found, and far superior to any  $3\frac{1}{2}$  h.p. single I have come across, although I have ridden one or two of England's premier singles.

The valve gear is fairly silent, and I have not yet had a broken valve or other valve trouble. The only trouble I have had is belt slip, due to the direct drive, but I found that drilling the pulley greatly increased its gripping powers.

In case it would interest any fellow public school boys, I may mention that this is the machine which came in second in Class III. at the Public Schools' Hill-climb at Broadway in 1916, ridden by C. C. Bemrose.

MILFORD TWEEDY.

#### CENTRIFUGAL FORCE.

Sir,—I should like to say, in reply to "A.W.T.," that, in my opinion, the action he describes, although it undoubtedly exists, is only a minor one. To investigate this, let "A.W.T." take an ordinary push-cycle, and when he is going as straight as he can, let him stop dead, and then try to keep up by "altering the base of support under the centre of gravity" by turning the handle-bars, leaning his body, etc. Unless he is a trick cyclist he will find it almost impossible to keep up for long. If the cycle, however, is moving only very slowly, it will not be very difficult to maintain balance.

This points to the fact that there are forces in operation only when the cycle is in motion tending to keep it up, also that these forces have a far greater effect than the action above described. These forces are:

1. Centrifugal force, acting as "Mohandis" has stated.
2. A gyroscopic action of the wheels.

One can easily prove the importance of this second action by taking a cycle wheel out of the frame, holding it by the ends of the spindle, getting someone to set the wheel spinning, and then trying to turn the wheel on its side. If the wheel is going at speed, it is quite impossible to do so; while if going very slowly it is no easy task. Anyone who has not tried this will be greatly surprised, on doing so, at the magnitude of the action, and, I venture to say, will have no further doubt as to what is largely instrumental in keeping a cycle upright. When a cycle is going at a fair speed, the cyclist can generally sit steady enough for this gyroscopic action to overcome any tendency to fall. Should he, from any cause, get sufficiently out of the perpendicular to overcome the gyroscopic action, he has recourse to centrifugal force, and (to a slight degree) to the action "A.W.T." describes.

To sum up, when travelling fast on the straight, gyroscopic action almost exclusively applies. When going at medium and slow speeds on the straight, both centrifugal force and gyroscopic action are largely used. For corner work and steering generally, chiefly centrifugal force is employed. When a cyclist rights himself after turning a corner, he leans himself slightly away from the centre of the circle round an arc of which he is riding, so that the component of his weight tending to pull him inwards is less than the centrifugal force tending to push him out, so that he rights himself, and, going straight at once, both forces cease to operate, and he remains vertical. Mechanical balance is used slightly when centrifugal force operates.

Bristol.

G.R.B.



## A TEST WITH PARAFFIN.

Sir,—Having noticed many letters from delighted owners of motor bicycles, I would like to say a few words about my 3 h.p. Enfield twin. When the petrol shortage came one of my friends, who owns a 7-9 h.p. Indian, had a little wager with me, viz., which machine would run better on pure paraffin, so we had a test on a steep incline on Atkinson Road, Old Benwell. We injected some petrol in the cylinder, and at once started on our climb. There was little to choose between the two machines for the first 100 yards, then the Indian stopped dead, and I went up the hill like a bird. Nothing could make my friend's machine go on the heavy fuel. I may say that my Enfield is the best machine I have had, and I have had a variety.

J. CONEY.

## AVERAGE SPEED.

Sir,—In connection with your issue of September 27th and the letter by "Icantellum," may I say that I live in Essex, and have driven a 5 h.p. three-speed Indian from Margaretting to the top of Widdford Hill, outside Chelmsford, five miles, with an eight-stone passenger behind, in 6m. 15s., which is 48 m.p.h. over five miles of give-and-take road, with a right-angle turn at Hylands.

I have done faster journeys in the car (90 h.p. Mercedes), but these do not count.

I am home from a part where one does not get a weekly issue of the old paper, or I would have written sooner.

Woolwich.

W.H.S.

Sir,—Seeing your article *re* average speeds in your issue of August 30th, I thought the following might be of interest.

In August, 1915, I left Gerrard's Cross, Bucks, for Bridlington, Yorks, at 4.45 a.m. I took the Great North Road from Hatfield to Norman's Cross, thence to Peterborough, Lincoln (which I passed through at nine o'clock), and Barton-on-Humber, arriving there at 10.10. I then crossed by ferry to Hull, which occupied 1 hour 20 minutes. Leaving Hull at 11.30, I arrived at Bridlington at 12.45 p.m. Taking off the ferry time (1 hour 20 minutes), the distance (209 miles by speedometer) was covered in 6 hours 40 minutes, or 31.35 m.p.h. I used 1½ gallons of petrol on the journey. My machine was a 3½ h.p. two-speed Humber, late 1912.

I am at present with the Signals as a D.R. in Palestine. Having been on the desert for over eighteen months, I fully endorse "Milk and Honey's" remarks about "wadis."

We all look forward to the mails arriving for a glimpse of the "Old Blue Cover."

H.R.W. (CPL., R.E.)

Palestine.

Sir,—Unless my memory is playing sad tricks with me, I am of the opinion that the 3½ h.p. record for one mile is somewhere round about 78 m.p.h. [76.69 m.p.h.—Ed.], and this with the skilled resources of experimental workshops, and a stripped machine. It therefore gives rise to interest, almost, shall I say, to scepticism, to read in your columns of the 11th inst. statements by "E.K., R.F.C.," that his 3½ h.p. Sunbeam has done 75 m.p.h. in touring trim. Now, sir, not being inherently unbelieving, I should be deeply interested to learn, through your paper, if this speed were checked by accurate timing or merely by speedometer.

Having graduated through all types of machines since surface carburettor days, it is amazing to find the number of machines which consistently refuse to live up to speedometer readings when tested against the watch on the track. On one occasion I rode a well known, very well known, 3½ h.p. flat twin, and its speed was 73 on the track, stripped, and in a condition quite unrideable on the road. Recently I have had the pleasure of using a special 3½ h.p. single of a make not unknown for its speed capability. Stripped it once did 73.

In conclusion, regarding high averages, as a member of society, in addition to being one of the keenest of motor cyclists, I appeal to you to use your influence to curb the irrepressible foolishness of youth, and prevent our sport from getting into such repute through averages involving prolonged speed bursts, and necessarily obtained by totally objectionable road-hogging, by obviously irresponsible individuals. Let "E.K., R.F.C.," and other exponents of long distance blinds give up their unworthy striving after petty fame, and use the roads in a law-abiding and civilised manner, and thus cease from being objectionable to other members of humanity who use the public highways.

Salisbury.

J.A.H.

## THE IDEAL SOLO MOUNT.

Sir,—I read with great interest your correspondent "J.W.G.B.'s" letter concerning the ideal solo mount. I have at present a 1917 two-speed Calthorpe-Jap, and it is as good a solo mount as I could desire. Previously I had a 1915 3½ h.p. Brough flat twin. This was a very last mount. I could do about 65 m.p.h. on top gear and about 35 m.p.h. on low gear. The only faults I found with this machine were the lack of a third gear and its lack of power on hills. I could do about 70 m.p.g. on the Brough compared with 110-120 m.p.g. on my Calthorpe. I also had a Triumph before the Brough, on which I could do about 50 m.p.h. and about 80 m.p.g. My Calthorpe will do 45-50 m.p.h. at present. It is very light on tyres and oil, and on present day roads can, I think, hold its own with most 3½ h.p. singles. With a little trouble I am sure the Calthorpe could be made to do over 50 m.p.h. Personally, I do not see the point of having a 3½ h.p. machine with its extra weight, increased petrol consumption, etc., when a lightweight will do the work quite as well. I can drive for long periods at 30-35 m.p.h. without overheating if the engine is fitted with a good plug, and I can always open out to 40 m.p.h. when the roads permit it.

When lightweight four-strokes become better known I am sure a great many riders will use them instead of 3½ h.p. and heavier machines.

I have no connection with the Calthorpe Co., but am just a satisfied owner.

CADET.

Dartmouth.

## COOLING AND LUBRICATION.

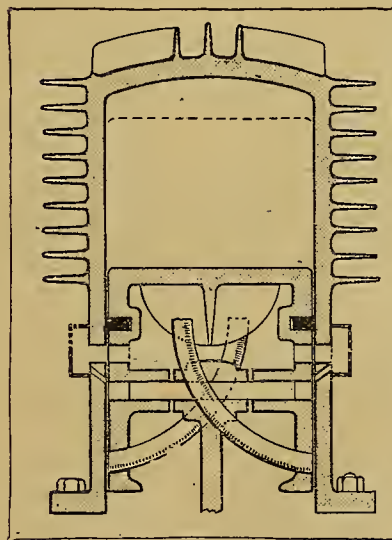
Sir,—May I thank "Chinook" for his invaluable hint *re* the dangers of crank case vacuum, and may I also suggest that his design of piston cooling, by retaining the com-

pression and vacuum respectively until the extreme end of each stroke, would be liable to create the very dangers he warns me against, not to mention other annoyances (petty and otherwise) obvious to the veriest novice?

I send a tracing of "Chinook's" piston with an addition which would really enable a blast of cold air to play on the cooling fins as well as release crank case vacuum before the extremity of piston stroke is reached. The pipes could be attached to gudgeon pin bosses and slotted at top end to engage on fins, allowing blasts to play on both sides. The fins would need to be planned at an angle of 45° in relation to gudgeon to allow clearance for connecting rod movement. One of the usual types of compression release could be incorporated as an auxiliary to or substitute for "Chinook's" release.

J.W.

How a cooling blast may be directed upon the underside of the piston head.



Belfast.

Sir,—Whilst the suggestion by "Engro" (October 11th, page 348) of insulating the underside of the piston from the heat of combustion and thereby preserving the lubricant may be partly successful, it is likely to cause more serious trouble than that which he is endeavouring to obviate.

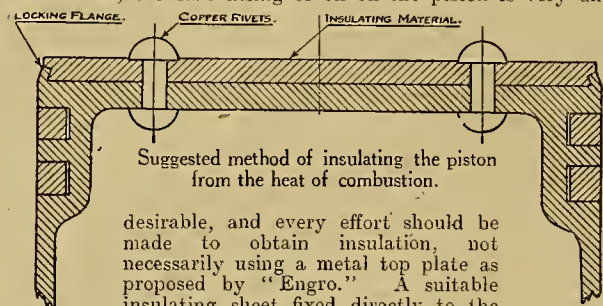
Your contributor states that at first sight there will be increased danger from pre-ignition, and endeavours to dispose of this by the fact that the heat capacity of the top plate is small. It is difficult to see how the mixture will cool the plate sufficiently to prevent pre-ignition when com-



pressing, as pre-ignition is frequently due to plug electrodes and other small projections, in which the area of surface bears a much greater ratio to the heat capacity than is the case under consideration.

Presuming that the engine is running at the highest temperature permissible to avoid pre-ignition, as is often the case for maximum power, the increase of temperature with reduction of conducting surfaces would mean immediate pre-ignition. The reduction of compression to meet this would probably bring the power approximately as before.

However, the carbonising of oil on the piston is very un-



desirable, and every effort should be made to obtain insulation, not necessarily using a metal top plate as proposed by "Engro." A suitable insulating sheet fixed directly to the piston top should not be an impossibility, as we now have asbestos, etc., manufactured into many forms and guaranteed to resist petrol, oils, acids, etc. This would not increase the weight of the piston to the same extent as the designs illustrated. The sketch herewith shows the sheet fixed with copper rivets, and in the case of steel pistons the edge locked to prevent curling up by rolling a thin flange into the side of the insulating sheet.

Returning to our present construction of pistons and combustion chambers, I am of opinion that we have not yet obtained the best results possible with metal alone. It is not impracticable to design these parts so that they may be highly polished and nickel plated, this being the best condition for reducing carbonisation, absorption of heat, and pre-ignition to a minimum. Nickel plating is suggested, as the coefficients of expansions of steel, iron, and nickel are practically identical.

Unless such an improvement of surfaces were effected the improved heat efficiency referred to in the last paragraph of "Engro's" article would not imply higher power for the same bore and stroke, as we are always limited by the pre-ignition temperature.

JAMES F. JACKSON.

#### THE SINGLE V. THE FLAT TWIN.

Sir,—As a D.R. for the whole period of the war and two and a half years' continual service on the Egyptian and Palestine Front, I claim to be able to speak from experience, having ridden both classes of machine, and the outstanding fact remains that the 2½ h.p. twin is not up to the hard work that obtains in this country. I have met many D.R.'s who have been to France, and who sigh for the chance to return there. What with riding across ploughed fields, dust, and sand of the heaviest nature, along "wadi" beds strewn with rocks and huge boulders, and climbing up the mountainous sides of the aforesaid "wadis," D.R.-ing in Palestine is decidedly not a bed of roses.

Speaking metaphorically, there are no roads for a D.R. in the forward area here. A D.R. just makes his point on the map, fixes his direction, and makes for the point as the crow flies—straight across country. If he knows of a camel track, he makes for it, and so on. A newly-made camel track (about 9in.-12in. wide) is the "joy of life" to a D.R. here.

E.E.F.

A. C. WEBB.

Sir,—I notice in the issue of October 4th a further lengthy letter on this subject by the "Two Lieutenants." I notice also that their former plea for a plebiscite of D.R.'s is abandoned.

Speaking of the Douglas the "Two Lieutenants" say: "But our contention is that behind the lines is its sphere."

Why is this dead set made at the Douglas? Why are Messrs. Douglas Bros. not permitted to supply a type of machine fitted with high wide mudguards and three-speed gears with handle-bar-controlled clutches suitable for work in deep mud? Such models exist and have existed for

years, but the only model passed for solo service is the 1913 two-speed clutchless T.T. pattern.

I personally ride, and have ridden since 1909, the Douglas because it is the more suitable make for the difficult and dangerous country where my work lies. I have no pecuniary interest in the firm, worse luck! I ride and praise it because it is the only machine that I, as a man over fifty years of age, dare ride over downs and field tracks.

As regards reliability, I average over 1,000 miles a month, and have not touched the engine of my 3½ h.p. sidecar machine (on which nine-tenths of my work is done), save to adjust exhaust tappets, since February last, as I said in my previous letter.

I am afraid the "Two Lieutenants" are trying to set back the clock. The whole motor cycle world is out to copy the flat twin, the merits of which Messrs. Douglas Bros., a Bristol firm, had the foresight to see in 1908. To-day, in the middle of this world war, at least eight British firms, not to mention others in America, France, and Italy, are making twin-opposed engines.

And our young gentlemen are wanting us to go back to the single-cylinder—a principle abandoned in the motor car world years ago.

CHARLES S. PATTERSON, M.B., M.R.C.S.

(Late Trials Judge Auto-Cycle Union).

#### ACETYLENE ENGINE DESIGN.

Sir,—May I be allowed to criticise the design for an acetylene engine submitted by your correspondent Mr. C. L. Whatley? He suggests an inlet valve remaining open till nearly the end of the compression stroke! This would merely be sucking gas into the cylinder and blowing it out again—to waste. This also brings us up against that other great danger of acetylene—its extreme inflammability. We all know how the slightest leak from our acetylene lamps seems to light up almost from nowhere. Then again, this gas has a much wider range of explosiveness than petrol or coal gas. What would be much too weak a mixture for petrol or gas to fire would with acetylene in the same proportion explode quite readily. To run such an engine on the stand with gas blowing to waste would almost certainly take the roof off any garage or outhouse the machine happened to be in.

Now, I may help Mr. Whatley by suggesting two alternative methods of attaining the same end, i.e., reducing the compression to safe limits.

(1.) By increasing the compression space by 200% we could reduce 75 lb. compression on a standard machine to about 25 lb. This I regard as impracticable, because of being very uneconomical, and because no plug would stand the temperature (and perhaps no lubricating oil either).

(2.) Inlet valve to open dead on top of suction stroke, and to close about one-third down suction stroke.

This latter would give a similar power to petrol.

ROBERT S. BOSWELL.

#### A SPORTING CHALLENGE.

Sir,—In the issue of October 4th I see that "Ixion" quotes the "Triumph people" as holding that no twin (and, *a fortiori*, no other single) can heat theirs with a sidecar in the sort of test that is compounded of a hot, twenty-mile scrap on the level, terminating in a climb up a really steep hill, such as Sunrising.

The same subject (that of twin and sidecar *versus* single and sidecar) is discussed by "The Critics" in the same issue, and the proposition that the smaller, simpler single can more than hold its own against the twin-cylinder is, perhaps, so contrary to what might have been expected that some statistics bearing on the subject are perhaps needed to substantiate the claim.

In the last Quarterly Trial (March, 1914), a fast hill-climb was included towards the end of the day. The fastest time in the sidecar class (irrespective of size of engine) was made by a single-cylinder—the Big Four Norton—in 23½s.

The average time for single-cylinder machines with sidecars was 43½s. The average time for twin-cylinders was 46½s. The average cubical capacity of the single was 556 c.c., and that of the twins 840 c.c.

These figures show the distinct superiority of the single-cylinder in such a test. Unfortunately, in view of the claim of the Triumph people as quoted by "Ixion," their machine was the slowest of the single-cylinders.

DAN BRADBURY.



# QUESTIONS AND REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of the envelope, and should be kept distinct from questions bearing on technical subjects.

## Timing.

**Q.** As I am building myself a small motor cycle engine, I should be grateful if you would give me the following information: (1.) What should be the relative position of piston with valves at both opening and closing stages for ordinary running (bore and stroke  $2\frac{3}{4} \times 3\frac{1}{2}$  in.)? (2.) What amount of lift is necessary?—both cams are on the one wheel.—F.H.S.

(1.) The standard timing for the average motor cycle engine is as follows: Set the exhaust valve to close just after the completion of the exhaust stroke. It will then commence to open when the piston is about one-seventh of the length of the stroke from the bottom of the firing stroke. The inlet should commence to open as the exhaust closes, and remain open for one complete stroke of the piston, or while the flywheels turn through  $180^\circ$ . (2.) The average amount of lift is  $\frac{1}{4}$  in. on a small engine.

## Substitutes.

**Q.** (1.) Would you please let me know which of the following is the best substitute for petrol: naphtha, turpentine substitute, or paraffin? (2.) Would it be all right to start on acetylene gas, keeping the substitute turned on at the same time? (3.) Would it be possible to start on substitute if it were first warmed up and then put in the carburettor? (4.) I have had the engine down to clean the pistons, and not disturbed the valve timing at all, but cannot get it to start owing to its firing through the exhaust. I should be grateful for your advice on the matter. The inlet valves are automatic, the engine being a Peugeot. (5.) Is there any way of reducing the explosion of acetylene gas? (6.) Is it possible to start on methylated spirit.—R.S.

(1.) Either naphtha or turpentine substitutes are quite good, and are better than paraffin. Of the two naphtha is the better. We presume you have read the paragraph on page 203 of the issue of September 27th relating to heavy oils. (2.) If you are willing to accept a certain amount of risk there is no reason why you should not do this, but we would not recommend it. (3.) No, it would not be possible to start on substitute, even if the carburettor were first warmed. (4.) Probably you have not screwed up one of the inlet unions sufficiently tightly, and a serious air leak prevents the engine from starting. (5.)

Only by reducing the quantity, and supplying a very weak mixture to the engine. (6.) We believe it is possible, but we have never tried it. One of our readers wrote stating that he was starting with methylated spirit with great success, and was using no petrol at all. We think that much difficulty will be experienced in cold weather.

## Four-stroking.

**Q.** (1.) What makes my Matchless two-stroke start four-stroking as soon as I reduce the speed to about fifteen miles per hour?

(2.) What is the correct mixture of petrol and oil for this machine? (3.) Does the percentage of oil have anything to do with four-stroking? (4.) Is it necessary to inject oil into the crank case?—H.R.

(1.) Very many two-strokes behave in the same manner. The conditions may often be improved by fitting a smaller jet. (2.) The correct mixture of petrol and oil is half a pint of oil to one gallon of petrol. (3.) Yes; too much oil causes four-stroking, and upsets the viscosity of the fuel. (4.) It is not necessary.

## IMPORTANT NOTICE.

### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILLIFFE & SONS LTD

## Coal Gas under Pressure.

**Q.** In order to run on coal gas, could you kindly tell me (1.) how to make a pressure pump, or where to get one? (2.) How do you bring the gas into the induction pipe via the carburettor? (3.) Is it necessary to retain the float chamber?—W.A.H.S.

(1.) With an ordinary air pump you would not be able to get a greater pressure than about 100 lb. to the square inch. To use coal gas with a pump of this kind, which usually takes in air through a hole in the top, you would have to fit a union to this hole and connect it to the gas supply, and you would also have to see that the top of the pump was quite gastight. It is

more practicable to use an ordinary gas bag, supplied from the house main, which would be filled in about a quarter of an hour. Pumping up a pressure feed reservoir would be a tedious and exhausting business. (2.) The gas is brought through a simple form of non-return valve, which is controlled by a tap interconnected with the ordinary petrol gas throttle. In some cases no non-return valve is used. (3.) A float chamber is not necessary.

## Acetylene Welding.

**Q.** I have the opportunity of acquiring a Sunbeam motor cycle, but the connecting rod is broken just above the big end. As it is almost impossible to get a new one, could I have this welded, and do you think a good thick weld would stand the strain?—W.H.L.

It is quite possible that one of the firms which advertise in this paper as acetylene welders would be able to repair the connecting rod in the way you suggest, or, at any rate, they would tell you whether they could recommend such a repair on seeing the work.

## Petrol.

**Q.** My son obtained a petrol licence last November for his motor cycle for pleasure purposes (four gallons a month for five months). Owing to illness he did not draw the full amount, and about April he received a notice from the Petrol Control Committee saying that the licence would not be renewed, but would remain valid till exhausted. He drew some petrol, but there is still an unexhausted balance of six or seven gallons. He has had no further notice from the Committee, but there have been some announcements in the papers that these licences are no longer valid. (1.) Is this licence still valid to buy petrol or not? (2.) I know that some or all of the petrol substitutes come under the same regulations as petrol, but are there any restrictions or need for a licence in purchasing ordinary paraffin for the motor cycle if my son can adapt the motor to run on pure paraffin, or on paraffin mixed with petrol?—J.H.H.R.

(1.) No, your son's licence is out of date. (2.) Paraffin is regarded as a petrol substitute by the Board of Trade when it is purchased for use in an internal combustion engine. Your son would be entitled, however, to use what petrol he has in stock during the present month.



### A Magneto Query.

**?** Is it possible for a new C.A.V. magneto to run down without being used when left standing for some time, and will it regain its strength after being run at a fast speed, or will it want re-charging again?—J.A.W.

No, it is quite impossible, unless there is some defect in the magneto, for it to lose its magnetism suddenly. If the magnetism for any reason is lost it cannot recuperate itself, but the magnets would have to be remagnetised. If the magneto were stored in a damp place, trouble would, of course, ensue.

### An Oval Cylinder.

**?** My machine is a 1915 two-stroke Calthorpe, and I have experienced difficulty in removing the cylinder. The first few times I removed it without any trouble at all, but now it gets tighter each time. This week I had to force the piston out of the mouth of the cylinder—it is easier to remove when warm—but to put it back was very much harder. It appears to me that the mouth of the cylinder has become smaller. There is no sticking of rings or anything else to prevent the piston coming out. There appears to be plenty of room for the piston immediately the cylinder reaches the holding down bolts. The piston and cylinder are clean. Is this a usual thing with two-stroke engines after, say, 5,000 miles? Can you suggest what is wrong and the remedy? Has the cylinder shrunk?—C.G.E.

Your trouble is probably not caused by the cylinder having shrunk, but by its having warped slightly, which is not a very rare occurrence with internal combustion engines, especially when they have been subjected to very sudden changes of temperature. The cylinder should be removed and its internal truth tested, and if it is found to be oval it should be ground up and a new piston fitted.

### Storing a Motor Cycle.

**Q** I am thinking of purchasing a good second-hand motor cycle, preferably a  $3\frac{1}{2}$  or 4 h.p. with variable gear, suitable for either solo or sidecar work. I am given to understand, and it seems a reasonable suggestion, that when the war is over and something like five million men return to their normal ways, there will probably be rather a run on motor cycles, and a consequent rise in second-hand prices. (1.) In view of this, do you consider it advisable for me to buy a machine, even if I had to lay it by until petrol is accessible? (2.) Is it possible to buy any kind of fuel whatsoever without a permit (except coal gas)? (3.) What is the best possible way of storing a machine to prevent the parts from deteriorating?—S.S.P.

(1.) We do not think you would be likely to lose very much so long as you made a judicious purchase. (2.) It is not permissible to purchase any sort of fuel whatsoever for a motor cycle without a permit, except coal gas. (3.) Keep the

tyres off the ground, slackly inflated, and occasionally moisten them; grease all parts which are likely to rust, and keep a cover over the machine. It must be stored in a dry place, where no steam can get to it, otherwise rust will creep under the plating and enamel.

### High Petrol Consumption.

**Q.** I have a 7 h.p. twin Ariel motor cycle which has never given satisfaction as regards petrol consumption. The best I have got is twenty-four miles to a gallon of petrol, but generally about twenty. The carburetter is an Amac (29 jet, level correct), with new air and throttle pistons. The compression is good, there are no air leaks at the unions, and the magneto gives a fairly good spark. The clearance between tappets and valves is the thickness of a visiting card. The machine is fitted with a coachbuilt sidecar and Enfield two-speed gear. The valve springs sometimes fail to lift, owing to their sticking on the bottom of the guides, with the result that there is a groove worn in the valves by the spring kicking to one side when it fails to get a straight lift. I find there is no remedy for this, as there is no clearance between cylinder and guides to fit larger springs. Now I am anxious to know (1.) if you could suggest a method whereby I can increase the miles per gallon? (2.) Could I obtain a new J.A.P. engine from the firm? (3.) Was the design of an Ariel such as I have a had one?—H. McL.

(1.) All we can imagine is that your magneto timing is incorrect. If by any chance it has been retarded, you would not be obtaining the normal power, and you would consequently have to open the throttle wider than should be necessary with a resultant waste of fuel. The spark should take place with the piston at the top of the stroke, and with the magneto two-thirds retarded. A 29 jet is somewhat smaller than the Ariel standard, a 32 jet being usually fitted. Are you certain that the jet you are using is a 29? It may be marked 29, but as your machine has been in use for some years it may have been reamed out a little. We have not previously heard of the valve springs failing to lift on this engine, or sticking at the bottom of their guides; as you say, there is not sufficient space between the cylinder and the guides to fit larger springs. We fear we can suggest no remedy. (2.) Unfortunately, the Ariel Co. cannot supply a new J.A.P. engine. It is very difficult to get one. (3.) They discontinued to manufacture your type of engine when they started with their present 5-6 h.p. twin, and since then they have concentrated on the latter and the  $3\frac{1}{2}$  h.p. single-cylinder model.

*In submitting to the Editor articles, photographs, or drawings, contributors are asked to mention whether the illustrations are exclusive, and further to enclose a stamped addressed envelope for return of unaccepted contributions.*

### Running on Paraffin.

**Q.** I have bought a second-hand New Hudson two-stroke lightweight, and am running it with half petrol, half paraffin, and am getting about 120 miles to the gallon. I have coiled the feed pipe once round the cylinder, and fitted a hot air intake. The makers advise three measures full of lubricating oil to every gallon of petrol. Since using paraffin I have increased it to four measures. I also use moth balls, and find since using them a greasy deposit issues from the exhaust. I find that the engine runs better on the mixture. I start up on petrol. Would you kindly answer the following: (1.) Will the mixture harm the engine? (2.) Is heating the fuel all right? (3.) Am I using enough lubricating oil? (4.) Are moth balls good for the engine? (5.) Is the deposit coming through the exhaust in order? (6.) Do the main bearings and crank pin get sufficient lubrication from the petrol system, as there is no place to put oil in the crank case? (7.) How does one lubricate the magneto, as there are no oil holes in the bearings? —T.H.K.

(1.) The mixture would not harm the engine if you are using a good quality lubricating oil. (2.) The heating of the fuel is quite correct. (3.) We should say you are using enough. (4.) We do not think these would make any difference. (5.) We do not think this is anything about which you need worry. (6.) So far as we can see, the main bearings, etc., get sufficient lubricant. (7.) If there are no oil holes in the magneto, you need not worry, as the bearings are packed with grease, and should last for several years without attention.

## RECOMMENDED ROUTES.

ROTHERHAM TO SOUTHPORT.—R.H.Y.

Rotherham, Sheffield, Glossop, Stalybridge, Manchester, Wigan, Southport. Approximately 90 miles.

BIRMINGHAM TO NEATH.—B.C.

Birmingham, Bromsgrove, Droitwich, Worcester, Malvern, Ledbury, Ross, Monmouth, Usk, Newport, Cardiff, Cowbridge, Bridgend, Neath. Approximately 135 miles.

DARLINGTON TO CARK.—J.R.

Darlington, Scotch Corner, Richmond, Halfpenny House, Askrigg, Hardrow, Sedburgh, Kendal, Levens Bridge, Lindale, Cark. Approximately 81 miles.

LEICESTER TO BLACKPOOL.—E.O.

Leicester, Loughborough, Derby, Ashbourne, Leek, Congleton, Holmes Chapel, Northwich, Warrington, Newton-le-Willows, Wigan, Preston, Lytham, Blackpool. Approximately 145 miles.

SHEFFIELD TO FELINSTOWE.—J.W.S.

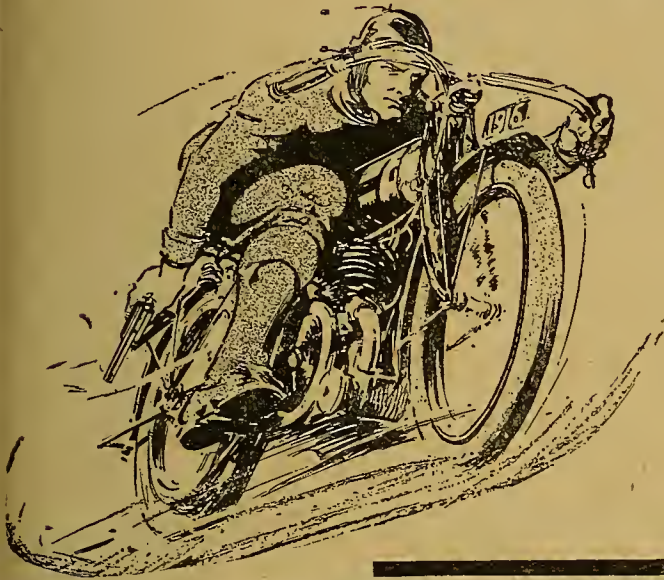
Sheffield, Worksop, Newark, Leadenham, Sleaford, Swineshead, Long Sutton, King's Lynn, Stoke Ferry, Mundford, Thetford, Ixworth, Stowmarket, Needham Market, Ipswich, Felixstowe. Approximately 175 miles.



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"After the lot of trouble experienced with certain magnetos I thought it only fair to let you know how satisfactory your productions are. I have never had occasion even to take the mag. cover off except for retiming, and speaking to an officer he said for twelve months he had not seen inside his mag., which was also a C.A.V., and in his words your magnetos are **IT**, and we have to fear German goods no longer."

Corporal, Royal Engineers,  
B.E.F., France.

Write for Art Folder and Spare Parts List.



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Established 1897.

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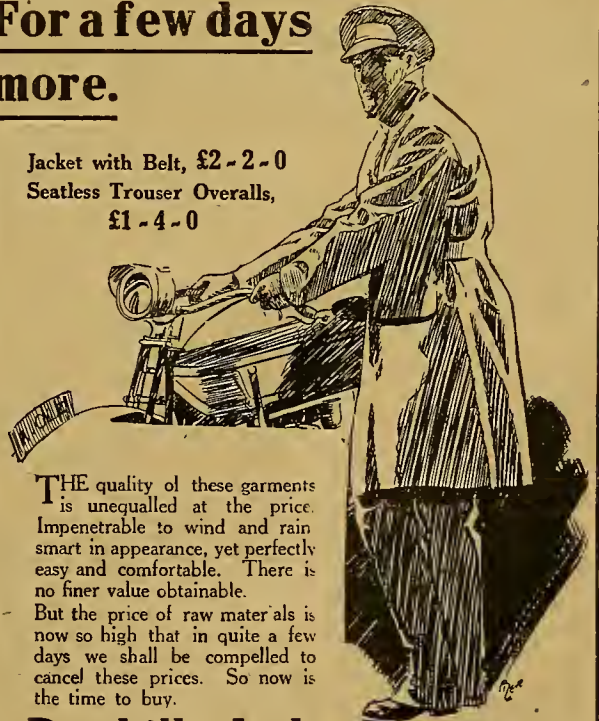


BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

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### For a few days more.

Jacket with Belt, £2-2-0  
Seatless Trouser Overalls,  
£1-4-0



THE quality of these garments is unequalled at the price. Impenetrable to wind and rain smart in appearance, yet perfectly easy and comfortable. There is no finer value obtainable. But the price of raw materials is now so high that in quite a few days we shall be compelled to cancel these prices. So now is the time to buy.

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359-361, Euston Road, N.W.

Manchester:  
90 & 92, Cross Street.  
Glasgow:  
72, St. Vincent Street.

*In answering these advertisements it is desirable to mention "The Motor Cycle."*



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd.**, and crossed **& Co.**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305]

A.J.S., 1915 model, 2½ h.p., standard throughout, perfect condition, used little; £50.—Parker's, Bradshawgate, Bolton. [X7493]

A.J.S. 6h.p. Combination, late 1916, fitted with spare wheel, lamps, tubes, etc., in perfect condition; £100, spot cash.—9, Hanover Sq., Leeds. [X7308]

A.J.S. 6h.p. Combination, 3-speed, Lucas lamps, horn, Cowey, hood, screen, apron, luggage grid, spares; £70, offers.—Box 14, 923, c/o The Motor Cycle. [9506]

A.J.S., 2½ h.p., 1914, 3-speed, clutch, T.T. bars, head lamps, generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.I. [9669]

2½ h.p. A.J.S., 1915 model, smart, 3-speed gear, handle-bar controlled clutch, kick starter, chain drive, transmission covered in, includes all accessories, ready for the road; £40, guaranteed.—Wauchope's, 9, Shoe Lane, London. [9601]

A.J.S. 1916½ Combination, 6h.p., detachable wheels, spare wheel with new Palmer cord steel-studded combination tyre, hood, screen, luggage carrier, horn, Watford speedometer, spare countershaft chain, 2 Lucas lamps and generators, Morgan vaporiser, with tank and copper connecting pipes, all accessories, first-class condition, had very careful usage; £100.—Box 21, P.O., Middlesbrough. [9537]



here—and just note these lightweight others, representing 'some VALUE and ECONOMY'—They're at EVANS, who controls many leading makes:

CONNAUGHT, 2½ h.p., 2-st. £28 17 6  
CONNAUGHT, 2½ h.p., 2-speed £36 6  
ENFIELD, 2½ h.p., 2-sp., 2-st. 42 gns.  
ENFIELD, 3 h.p., twin, 2-speed 55 gns.  
ENFIELD Combination ..... 90 gns.

NEW IMPERIAL, 2 h.p., 2-speed ..... £40 19 0

NEW IMPERIAL, 2½ h.p., clutch ..... £48 6 0

NEW IMPERIAL, lady's ..... £50 8 0

ROVER, 3½ h.p., countershaft 3-speed ..... £80 0 0

ROVER, 3½ h.p., Sidecar Combination ..... £105 5 0

ROVER, 3½ h.p. T.T., with hand-cont'd Philipson pulley ..... £67 10 0

ROVER, 3½ h.p. T.T., with-out Philipson pulley .. £62 10 0

ROVER, coachbuilt sidecar £26 5 0

ROVER, 5-6 h.p. Twin ..... £97 10 0

ROVER, 5-6 h.p. Twin, with coachbuilt sidecar .... £124 5 0

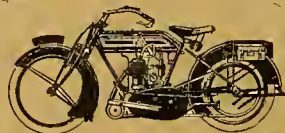
CALTHORPE-J.A.P., 2-speed... £39 13

CALTHORPE, lady's, 2-speed... £37 13

CALTHORPE, 3½ h.p., coach Combination..... 72 gns.

Then resolve to view, compare, and satisfy your motor cycling need. Closed at one on Saturdays. Delivery at once. Note—at

**P.J. EVANS**  
87-91, John Bright Street,  
BIRMINGHAM.  
Phone: Mid. 662. Wires: Lylcar, B'ham.



Rover 3½ h.p., Countershaft, 3-speed .. £80.

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Column Advertisement in this issue  
for SPECIAL BARGAINS in  
**TYRES.**

**Photography**  
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Every Wednesday Twopence.

## MOTOR CYCLES FOR SALE.

### A.J.S.

1915-16 A.J.S. 6h.p. Combination, luxuriously equipped, hood, screen, spare wheel, 3 Lucas lamps, Cowey, Stewart horn, etc.; cost £130 June 1, bargain, £90.—123, Piastone St., Sheffield. [1]

### Alcyon.

ALCYON, 2h.p., Bosch, Amac, perfect order, engine just overhauled; £12.—Phipps, 179, Park St., Sittingbourne. [1]

### Alldays.

COLMORE Depots, Birmingham and Manchester, immediate delivery of—Allon 2-strokes. [1]

ALLDAYS Matchless, 1914, 2½ h.p., 3-speed; £21. H. J. Marston, 50, Argyle St., Birkenhead. [1]

ALLON, 2½ h.p., late 1915, 2-stroke, 2-speed, 1 controlled clutch; £25; petrol.—Spencer, Snyr Taxes, Poole, Dorset. [1]

ALLON, practically new, only done 100 miles, 1st and speedometer; £26.—Blackburn, 22, Model Tages, East Sheen, S.W. [X7]

1916 Allon de Luxe, 2½ h.p., 2-speed, clutch, starter, excellent condition; cheap; owner (a cal man) joined army.—24, Higher Bridge St., Bole. [X7]

WAUCHOPE'S, 9, Shoe Lane, London, for immediate delivery of new 2-stroke, 2-speed Allon 1915; £42; 2% extra only for easy terms.—Wauchope's, Shoe Lane, London. [9]

ALLON (new), 2½ h.p., 2-stroke, all models in stock immediate delivery; carriage paid to any rail station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9]

ALLON, 1915, 2-speed, 2-stroke, pan saddle, £39 single speed (new), £36; 2-speed new, £42; 2nd and hand clutch, new, £45; extended payments or change; Alldays Allon, 1915, 2-speed, Dunlop 45 enameled and plating good, £30/17/6.—Service 292, High Holborn. [X7]

### Ariel.

ARIEL, 3½ h.p., 1917, 3-speed countershaft model in stock.—Crow Bros., Guildford. [2]

COLMORE Depots, Birmingham and Manchester, in pool, and Leicester, for Ariel motor cycles. [10]

ARIEL, 1914-15, 3½ h.p., 3-speed, clutch, perfect running order; bargain, £45.—Colliver, Woodbine Tage, Saltford, near Bristol. [9]

ARIEL, 1915, 3-speed, and clutch, 5-6 h.p., api seat-pillar, Dunlop tyres, hood and screen, 1st lamp and Cowey speedometer; £71/15; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7]

ARIEL (new), 3½ h.p., 3-speed countershaft model, clutch, and kick-starter, decompressor, 2nd spring seat pillar; £72; carriage paid to any rail station in Great Britain; extended payments arranged.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9]

### Arno.

ARNO, 3-speed, take sidcar anywhere; £20.—Jov Garage, Broadway, Muswell Hill, N.10. [9]

### Auto-Wheels.

1914 Auto-Wheel, B.S.A. model, perfect order; £24. [9]

1913 Auto-Wheel, almost new; £7. [9]

1916 Auto-Wheel, B.S.A. model, as new, been at 500 miles; £10.—Walbro, High St., Saff Walden. [X7]

AUTO-WHEEL, splendid order; £5.—21, Tindal Chelmsford. [9]

AUTO-WHEELS, one B.S.A. model £9, and one V £7.—T. H. Gosling and Son, Revesby, Boston [X7]

AUTO-WHEEL, perfect condition, and good bicycle; £12/12.—A.W., 31, Fonthill Rd., N.4 [9]

### Bat.

BAT-J.A.P., 3½ h.p., free engine; £22.—Buckingham Tindal St., Chelmsford. [9]

BAT-J.A.P., 1910, 4h.p., and wicker sidecar, 2-speed climb anything, splendid condition throughout, used for 3 years; £24.—George, Deer Park, Tenby [X7]

BAT Combination, 1913, purchased 1914, 6h.p., speed, chain driven, countershaft, kick starter, 1915 Sonapry, excellent £18/18 cane sidecar, luggage carrier, spares, 2 valves, 2 tubes, 2 chains; kid 1915, in good condition; £48, or offer.—Hamilton, B. port. [9]

### Bradbury.

1914 Bradbury, 4½ h.p., N.S.U. 2-speed, condition new; bargain, £28.—26, Loxley New Rd., Sl. field. [X7]

BRADBURY, 1912, 3½ h.p., Bosch, B. and B. 4—Grl. Greenwood, R.E. Detachment, Felixst. Perry, Suffolk. [9]



## MOTOR CYCLES FOR SALE.

## Bradbury.

RADBURY, 1912-13, 3-speed, and coach sidecar, £35/10; 3½ h.p., 2-speed, chain drive, £24/10; for Exchange, Horton St., Halifax. [9244]  
 RADBURY, 1912, 4 h.p., clutch, Bosch, Amal, Druid forks, both standing; first for £15/10 res.—P. Webster, Warwick Rd., Kenilworth. [X7379]

## Brough.

ROUGH, 1916 model, 2-speed, splendid condition; 48 gns.—Julians, 84, Broad St., Reading. 'Phone: [0926]

ROUGH 1916 3½ h.p. horizontal twin, 3-speed Sturmey countershaft, hand clutch, auxiliary tank, 15 new Dunlops, just overhauled cost of £7, spares; gear offer; exchange higher power.—Box 1368, The Motor Cycle. [X7309]

## Brown.

h.p. Brown, 2-speed N.S.U. gear, in fine order; a ship, £22.—Jones, Garage, Broadway, Muswell Hill. [9511]

## B.S.A.

LMORE Depots 261, Deansgate, Manchester, for quickest delivery of B.S.A. [0798]

S.A., 3½ h.p., F.E., 2-speed, 1913: £35.—H. J. Marston, 50, Argyle St., Birkenhead. [9466]

15 Model K B.S.A. Combination, in good order; £48.—Jones, Garage, Broadway, Muswell Hill. [9521]

S.A. Combination, 1917; cost £86 two months ago; best offer; Birmingham district.—Box 14, 927, The Motor Cycle. [9655]

S.A., 3½ h.p., late 1913, 2-speed, sidecar, lamps, accessories, splendid order; £40.—Dickinson, 95, Norfolk St., Bedford. [9406]

15 B.S.A. Model K, large Canoelet sidecar, with all lamps, and in good order; £55, complete.—Walbro, St., Saffron Walden. [X7329]

17 B.S.A. Model K, large Canoelet sidecar, all accessories, as new, and in perfect order, complete; —Walbro, High St., Saffron Walden. [X7326]

S.A., 1913, 2-speed, in splendid order, very little used, just overhauled thoroughly by B.S.A.; any £30.—Telford Garage, 47, Streatham Hill, S.W. [9464]

S.A., 4½ h.p., 1916½, chain-cum-belt, and 1917 B.S.A. sidecar, with wind screen, lamps, mechanism, speedometer; £70.—503, Harrow Rd., Paddington, London. [9447]

S.A., 1916, all chain, perfect condition, except back tyre; £50; part exchange lightweight considered. T. B. Singleton, Woodhouse Lodge, Great Horw, Colchester. [9405]

S.A., 1914, 4½ h.p., all chain, 3-speed countershaft, smart coach sidecar, complete, accessories, speedometer, fast, reliable, excellent order throughout; £45. Limes Av., New Southgate. [9634]

13 B.S.A., 2 speed, free engine and kick starter, just been overhauled, with coachbuilt sidecar, all dete with lamps and horn; £35; only wants seeing. lbro, High St., Saffron Walden. [X7327]

S.A., 1916 Model K, B.S.A. No. 2 sidecar, wind screen, and hood, Lucas electric lamps, throughout, lometer, perfect condition; £70; after 6 p.m.—say, 281, Borough High St., Southwark, S.E.1. [9529]

S.A., 1916 4½ h.p. Chain-cum-belt Combination, splendid condition, Lucas lamps, speedometer, mechanical horn, wind screen, luggage carrier, extra heavy Dunlop, spare belt, valves, tools; £68. titts, 109, High St., Camden Town. [9453]

h.p. B.S.A., 1915 model, 3-speed countershaft gear, kick starter and free engine. £50, includes accessories; also a 1916 model 4½ h.p. B.S.A., fitted an Empress Mills and Fulford sidecar, 3-speed, start and free engine clutch, £65, accessories ded; both machines carry our usual guarantee of nical fitness.—Wauchope's, 9, Shoe Lane, Fleet London. [9603]

## Calthorpe.

h.p. Calthorpe, 1915, 2-speed, 100 m.p.g., runs par- amu; £18.—152, Camberwell Grove, Camberwell. [9541]

THORPE-H.A.P., 1917, 2½ h.p., Enfield 2-speed gear; £30.—H. J. Marston, 50, Argyle St., Birkenhead. [9468]

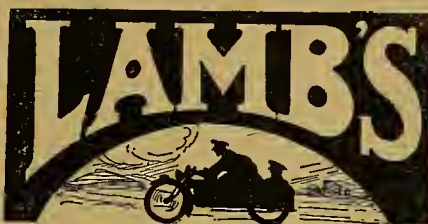
15½ Calthorpe-Jap, 2½ h.p., Enfield 2-speed, perfect condition; £24.—Kay, Bridge St., Gainsburgh. [9569]

THORPE, 2-stroke, 2-speed, 1915, condition perfect; £20.—G. P. Pattinson, Newton Hall, Mober, Koutford. [X6734]

THORPE-J.A.P., 1915, 2½ h.p., 2-speed; £23, complete with lamp, horn, etc.—H. J. Marston, 50, le St., Birkenhead. [9469]

THORPE.—1917 models in stock at P. J. Evans, John Bright St., Birmingham; the Birmingham and agent. Two-strokes, four-strokes, and 4½ h.p. J.A.P. combination, also ladies' models. [9147]

W 2½ h.p. Calthorpe-Japs, latest 1917 models, fitted with the very latest J.A.P. engine, Enfield gear, £39/18; also single-speed models, new, extended payments 2% only charged above these for the convenience.—Wauchope's, 9, Shoe Lane, ton. [9606]



## NEW MACHINES ACTUALLY IN STOCK.

MATCHLESS War Model 8 h.p. Combination, 3-speed, spare wheel ..... £120 0  
 MATCHLESS War Model with special lamps and horn ..... £125 0

NEW HUDSON V.I.A. Model de Luxe, 4 h.p., 3-speed, de Luxe Sidecar .... £84 18  
 JAMES, 1918, 5-6 h.p., twin. The latest £84 0

ENFIELD, 1917, 2½ h.p., 2-sp., 2-stroke; 3 lamps, horn, etc. .... £44 2  
 HARLEY-DAVIDSON, 1917, magneto model, bulbous back H.D. Sidecar £130 0

ROVER, 1918, 5-6 h.p., twin, Combination, £124 5; or solo ..... £97 10  
 ROVER, 1917, 3½ h.p., solo model, lamps and horn. Rare bargain ..... £68 10

ROVER, 1917, 3½ h.p., 3-speed countershaft, Combination with Sidecar; present price £106/4/6; our price £99/4/6

ARIEL, 1917, 3½ h.p., 3-speed, Com. .... £93 10  
 LEVIS, 1917, 2½ h.p., 2-speed, Model E £47 10  
 LEVIS, Popular model ..... £32 0

CALTHORPE-J.A.P., 1917, 2½ h.p., 2-sp. Enfield gear ..... £39 16  
 ALLDAYS ALLON from ..... £37 10  
 ROYAL RUBY, all models, from ..... £32 10

## SECOND-HAND MACHINES.

ENFIELD, 1917, 3 h.p., speedometer, Lucas lamps, as new, ridden 400 miles £63 0

ENFIELD (two), 1916, 6 h.p., Combinations, Lucas dynamo set, hood and screen; respectively ..... £110 and £105

ENFIELD, 1914, 6 h.p., Comb. access. .... £68 10  
 ENFIELD, 1916-17, 6 h.p., with hood, speedometer, 3 Lucas lamps, horn, screen. Indistinguishable from new £115 0

TRIUMPH, 1914, 4 h.p., Sturmey-Archer gear, Sidecar, speedometer ..... £48 10  
 HARLEY-DAVIDSON (two), 1915, mag. models, with Sidecars £72 10 and £68 10

HARLEY-DAVIDSON, 1916, elec. model, H.D. Sidecar, as new ..... £89 10  
 HARLEY-DAVIDSON, 1915, elec. model, and Sidecar ..... £75 0

HARLEY-DAVIDSON (two), Models C, bulbous Sidecar, hood, screen, as new £22 10

SINGER, 1913, 4½ h.p., 2-speed countershaft, Combination cane Sidecar, speedometer, lamps, horn ..... £35 0

ARIEL, 1915-16, 3½ h.p., countershaft, Combination, kick start, speedometer, lamps, horn ..... £72 10

TORPEDO-PRECISION, 2½ h.p., band cl. £12 10

JAMES, 1916, No. 6, Comb., silencer, speedometer, lamps, horn, apron. .... £75 0

JAMES, 1913, 4½ h.p., solo, with access. £22 10

INDIAN, 7-9 h.p., 1915, clutch model, lamp, horn, enamel, plating as new £55 0

INDIAN, Powerplus, 1916, 7-9 h.p., 3-sp., Com., lamps, speedometer, horn ..... 70 gns.

LEVIS, Popular, 1916, sound, with access £25 10

A.J.S., 1914, 6 h.p., Com., 5 gn. speedometer, 3 lamps, horn, hood, screen £77 10

A.J.S., 1915, 4 h.p., Combination ..... £35 0

NEW HUDSON Com., 3½ h.p., 3-speed. £35 0

CONNAUGHT, 1916, 2½ h.p., s.-T.T. bars £22 10

ALLDAYS ALLON, 1915-16, single-sp., and accessories ..... £25 0

O.K. Junior, 1916, single-speed, 2-stroke £21 0

DOUGLAS, 1914 (late), 2-speed, clutch, kick start model, unscratched ..... £43 10

B.S.A. AUTO-WHEEL ..... £7 10  
 And another, splendid condition ..... £10 10  
 We have several Second-hand and New SIDECARS from ..... £6 10

PUSH CYCLE DEPT.—We have still an excellent assortment of Ladies' and Gents' Cycles in best makes. Ask for Lists.  
 WANTED.—FORD Van, not earlier than 1916; also B.S.A. Auto-wheel and B.S.A. Combinations.

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151, HIGH ST., Also at 50, HIGH RD., WALTHAMSTOW, WOOD GREEN, N.22

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 5 minutes Hoe St. (G.E.R.)  
 25 minutes from Liverpool St. Station. Book to Hoe Street.

## MOTOR CYCLES FOR SALE.

## Calthorpe.

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

1916 (Nov.), T.T. Calthorpe-Jap, 2½ h.p., disc wheels. Klaxon horn, lighting set, spares, valves, springs, tools, belt, handle grips, knee-grips, etc., mileage under 800, very fast, guaranteed perfect condition and tune: 30 gns.—Clement, Manor House, Ifield, Crawley, Sussex [9556]

## Chater-Lea-Jap.

CHATER-LEA No. 7, 3-speed gear box; chain drive, 5 h.p. twin J.A.P., with late improvements, B. and B. semi-automatic gear driven mag. lamps, Speedwell coach car, hood, wind screen, luggage grid, petrol carrier, tyres and tubes new, new spare chains, etc., smart combination, take four anywhere; bargain, £65, or near offer.—A. J. Butcher, 151, High St., Waltham Cross, Herts. [9481]

## Clyno.

CLYNO, 5-6 h.p., 1914, 3 speeds, kick starter; £40 —21, Tindal St., Chelmsford. [9640]

CLYNO War Office Combinations for early delivery from Colmore Depots, Birmingham and Manchester [0884]

CLYNO, 1912, 6 h.p., 2-speed, kick start, overhauled, lamp, horn, etc.; £32.—J. Shaw, 1, Ashville Terrace, Cardigan Rd., Leeds. [9594]

CLYNO, 1913-14, 5-6 h.p., 3-speed, and sidecar, P. and H. lamp set, Cowey and horn, sidecar complete with spare wheel, £62; 1914-15, 3-speed, 5-6 h.p. and sidecar, £69; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7471]

CLYNO Combination, 1914 twin-cyl. engine, detachable wheels, fitted with roomy family sidecar, 3-speed, kick starter, clutch, all chain drive transmission, £65; also another fitted with de Luxe sidecar, hood, screen, detachable wheels, spare wheel and tyre, with all accessories; £73/10; both carrying our guarantee of mechanical fitness.—Wauchope's, 9, Shoe Lane, Fleet St., London. [9602]

## Connaught.

CONNAUGHT, 1916, 2-stroke, complete with head lamp, generator, rear lamp, horn, etc., only done small mileage; bargain, £26.—Advertiser, 156, Gt. Portland St., W.1 [8774]

CONNAUGHT Miniature, single speed, oew, £33/17/6; ditto, 2-speed, £41/6/6; standard 2-speed, £42; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7473]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new; 42 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7472]

## De Dion.

DE DION, 3 h.p., 27; owner joined colours.—Applv, 25, Ashchurch Park Villas, W.12. [9637]

## Douglas.

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, 2½ h.p., 2 speeds, splendid condition, accessories.—Cooper, Westmoreland Av., Blackpool. [9413]

DOUGLAS, 2½ h.p., 1912, 2-speed; bargain, £25/10; Clapham (Motors), King George St., Greenwich. [X7419]

DOUGLAS, 1914, 2-speed, magnificent condition; 36 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [0927]

DOUGLAS, 2½ h.p., 1915, all accessories, good condition; 40 gns., or near.—42, Fox Lane, Palmer's Green. [9414]

DOUGLAS, 2½ h.p., late 1914, new tyres, lamps, etc., everything perfect; £34.—Sanderson, South Brink, Wisbech. [9483]

1914 Douglas Model U, lamps, speedometer; any trial; £30.—HARDRESSER, 410, Commercial Rd., Portsmouth. [9534]

DOUGLAS, 1914, T.T., 2 speeds, long exhaust; £33; Saturdays.—Soul, 29, Ropemakers Fields, Limehouse, E.14. [9398]

DOUGLAS, 1914 T.T., 2½ h.p., 2 speeds, fine condition; many others.—Griffin's, 89, Gt. Portland St., W.1. [8933]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil, Ta. 50. [5855]

COLMORE Depots, Birmingham, Manchester, and Liverpool, and Leicester, for earliest delivery of Douglas motor cycles. [0800]

2½ h.p. Douglas, 1916 W.D. Model, excellent condition, 2-speed, lamps; £55.—Woodruff, Mountfield, Robertsbridge, Sussex. [X7268]

DOUGLAS, 4 h.p., 2-speed, kick start, C.B. sidecar, perfect; £70.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9545]

2½ h.p. Model U Douglas, 3-speed, new tyres, all accessories, excellent condition; £42.—Applv, 121, Lower Ford St., Coventry. [X7492]

DOUGLAS, 2½ h.p., 1913 Model W, 2 speeds, speedometer, etc., condition excellent; £31/10.—W.J.P., 18, Guildford Rd., Woking. [X7334]

DOUGLAS, 1914, 2½ h.p. T.T. Model, 2-speed, only run about 3,000 miles, splendid condition; £37; 126, Newington Causeway, S.E.1. [9446]



## MOTOR CYCLES FOR SALE.

## Douglas.

1915 Douglas, 2½ h.p., 2 speeds, front and back lamp, horn, looks just like new, very fast; £49.—Walbro, High St., Saffron Walden. [X7328]

DOUGLAS, 1913, splendid condition throughout, clutch, kick start, lamps, tools, guaranteed; £34.—29, Poyning's Rd., Highgate, London. [X6996]

THREE 2½ h.p. Douglas Motor Cycles, from 30 gns.; 2-speed gear models, 1913-14 and 1915.—Wanchope's, 9, Shoe Lane, Fleet St., London. [9609]

DOUGLAS, 1914, 2½ h.p., 2-speed, clutch, kick start, splendid condition, under 3,000 miles, Lucas lamp, horn; £39.—Box 1,366, c/o The Motor Cycle. [X7263]

DOUGLAS, 4 h.p., W.D., 1916, clutch model, 3-speed, and kick start, perfect; £40; joining up; any trial given.—112, Gt. Cambridge St., Hackney Rd., N.E. [9424]

LATE 1915 Douglas, 2-speed, semi T.T. bars, first-class condition, very fast, set new lamps, horn, etc.; £40, no offers.—Ebdon, 10, Oakfield Terrace, Cheltenham. [X7436]

DOUGLAS, 1914 (late), 2-speed, kick start, lamps, and horn, condition unscratched; £45/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9503]

DOUGLAS Motor Cycles.—We can deliver 1917 Model W on receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol (Wholesale and retail.) [9323]

DOUGLAS, late 1914, Model V, T.T., 2-speed, 2½ h.p., long exhaust, all accessories, fast machine; what offers? seen any time; cash wanted.—Rinkside, Penrhyn Rd., Sarbiton, Surrey. [9485]

1915 2½ h.p. Douglas, 2-speed, touring handle-bars, footboards, Amac, 2 lamp sets, horn, Brooks case, excellent condition; £45.—Robinson's Garage, Green St., Cambridge. [9586]

1914 3½ h.p. Douglas and Sidecar, kick start, good condition, 5,000 miles, just overhauled, trip speedometer, Lucas lamps, horn, fuel, oil, carbide; bargain, £50, near offer.—Box 14,919, c/o The Motor Cycle. (D) [9425]

DOUGLAS, 2½ h.p., 2-speed, July, 1914, Lucas lamps and horn, Jones speedometer, many spares, just overhauled, mechanical condition and appearance as new; best offer over £35.—Hallows, Milverdale, Dunmow Hill, Fleet. [X7445]

SPORTING Douglas, T.T., late 1914, disc wheels, torpedo exhaust, new tyres, fully equipped, condition and appearance first-class, unusually fast machine; £42.—Lieut. Hudson, Military Hospital, Sutton Veny, Warminster. [X7410]

2½ h.p. Douglas, absolutely new; immediate delivery of models U, V, and W, clutch, kick-start, against priority permits, for doctors, farmers, war and munition workers. How and where to apply.—For full particulars, write to the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [9584]

DOUGLAS, 4 h.p., 3-speed, clutch, kick start, two different handle-bars, horn, lamps, separate generators (Lucas), bought 1916, spare valves, two belts, Dunlop and Zilla patent, tyres (Dunlop) nearly new, perfect condition, with brand new Cooper drop-back sidecar, grey, gold lined, 4-point underlugs chassis (Burbury), not yet unpacked; £68.—Capt. Williamson, R.A.M.O., Halton Camp, Wendover. [X7387]

## Edmund.

EDMUNDS (new), 2½ h.p. J.A.P., Royal Enfield 2-speed, spring frame, double tank, strongly built machine; £54/12/6; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9662]

## Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3 h.p. Two; £57/10; and 2½ h.p. 2-stroke; £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [9338]

ENFIELD Motor Cycles.—Prompt delivery all models.—P. J. Evans, John Bright St., Birmingham. [9148]

ENFIELD, 2½ h.p., 2 speeds, excellent condition, many others.—Griffin's, 89, Gt. Portland St., W.1. [8934]

1914 6 h.p. Enfield Combination, splendid condition, speedometer, horn, screen; £60.—54, Union St., Ryde. [9484]

ENFIELD, 3 h.p. twin, 1916 model, practically equal to new; 40 gns.—Julians, 84, Broad St., Reading. Phone: 1024. [9328]

1913 6 h.p. Enfield Combination, exceptional condition throughout; £40.—18, Berkeley Av., Rusholme, Manchester. [X7441]

1916 Enfield Combination, new tyres, good running order; £70.—Green, Newsoms Garage, Palace Parade, Hornsey, N. [9445]

1915 6 h.p. Enfield Combination, electric lamps, numerous spares, absolutely sound; £75.—Farrar's Motories, Hopwood Lane, Halifax. [9668]

1916 3 h.p. Twin Enfield, with best Watsonian sidecar, all accessories, perfect condition; £50, or near offer.—3, Laurel Rd., Barnes, S.W. [9578]

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Leopold St.,  
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MARK II

Made in  
three models,  
Solo or S'car.

## MOTOR CYCLES FOR SALE.

## Enfield.

ENFIELD, late 1915, 6 h.p. combination, magnificent condition; £68; spares, mileage 3,000.—E.C., Garratt Lane, Tooting, London, S.W.17. [X]

6 h.p. Enfield, 1914, 2-speed, handle starter, coach sidecar, head lamp, etc., perfect throughout.—Wardle, Aberford Rd., Woodlesford, Leeds. [X]

ENFIELD 6 h.p. Combination, late 1916, m.l. 1,500, equal to new throughout, date and cond. guaranteed; 75 gns.—280, Camberwell Rd., S.E.5. [X]

ENFIELD 6 h.p. Combination, late 1914, very used, lamps, horn, speedometer, etc.; £60.—My 197, London Rd., W. Croydon. Phone: 2379. [X]

1915 Enfield Combination, every accessory, condition, very low mileage; £68, or close for cash.—436, Whitehorse Rd., Thornton Heath. [X]

ENFIELD, 6 h.p., late 1914, 2-speed, handle start, good tyres, coachbuilt sidecar, head lamp, generator, rear lamp, fully equipped, and perfect throughout; bargain, £52/10.—Mebbs and M. 156, Gt. Portland St., W.1. [X]

ENFIELD, 2½ h.p., 1914, 2-speed, kick start, chain drive, Enfield grey, good tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout; bargain, £52/10.—Mebbs and M. 156, Gt. Portland St., W.1. [X]

1916 Enfield Combination, 6 h.p., Lucas dynamo, tag, hood, screen, mirror, speedometer, in good condition throughout; £105.—Eloe and Co., 1, Bishopsgate Av., Camomile St., E.C.3. [X]

ROYAL Enfield Combination, 1913 model, £55; combination, £65; 1915 combination, £75; combination, 80 gns., including hood and screen, wanted.—Wauchope's, 9, Shoe Lane, London. [X]

ENFIELD 6 h.p. 1916 Combination, Palmer cond. car, tyres all round, large head lamp, generator, rear lamp, luggage carrier to sidecar, very nice condition throughout, and fully equipped; £82/10.—Advent 156, Gt. Portland St., W.1. [X]

ENFIELD 1915 Combination, 6 h.p., 2-speed, with Thompson-Bennett mag., Amac carburetter, with lamps, Stewart speedometer, and horn, £87 2½ h.p. 2-speed, £20; E.P. or exchange.—Service 292, High Holborn, London. [X]

ENFIELD Combination, 6 h.p., absolutely as new, 900 miles, well fitted up, including Palmer light car tyres, 3 acetylene lamps, mechanical horn, 100 speedometer; first reasonable offer accepted; 1 sell.—F.E., 50, Hogarth Rd., Earl's Court. [X]

ROYAL Enfield Combination, 1917 model, beam turnout, condition as new, fitted with hood screen, Lucas dynamo lighting set, including large light, sidecar car lamp, and rear light, Palmer tyres in every respect new, tools complete, and Lucas horn; £115, guaranteed.—Wauchope's, 9, Shoe Lane, London. [X]

TWIN Enfield, 1916, 3 h.p., with Candelet sport sidecar, and complete with lamps, horn, sidecar, and tools in splendid condition and appearance almost like new; £55; carriage paid to railway station in Great Britain; extended payment if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [X]

ENFIELD 1916-17 6 h.p. Dynamo Combination, screen, speedometer, 105 gns.; also 1916 £105; also 1916 standard model, sold new May, 1917, with hood, screen, speedometer, quite like new, m.l. only 300 miles, £115; also 1917 3 h.p. solo, with speedometer, Lucas lamps, horn, £63; also 1917 2½ 2-speed model, £44/2; also 1914 6 h.p. combination perfect.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [X]

## Excelsior.

1914 Excelsior, 7.9 h.p. twin, clutch, and mag. m. £32.—54, Caval Rd., East Sheen, S.W. [X]

1913 4½ h.p. British Excelsior, 2 speeds, and chain fitted for paraffin, with or without O.B. and Walbro wind screen; what offers?—54, Lower Park Rd., Ashford, Kent. [X]

## Harley-Davidson.

COLMORE Depot, Birmingham, Manchester, Lpool, Leicester, for Harley-Davidsons. [X]

HARLEY-DAVIDSON Combination, 1916 m.l. Bosch mag., includes accessories; £75.—Wauchope's, 9, Shoe Lane, London. [X]

J. A. STACEY, 12, Ecclesall Rd., Sheffield, Harley-Davidsons; P. and H. lamp sets, speedometer for H.D., £3/5, carriage paid. [X]

1915 Model J. Harley Davidson, Empress and with screen, in absolutely perfect condition; £67/10.—Stacey, 12, Ecclesall Rd., Sheffield. [X]

1916 Harley-Davidson Combination, electric m.l. in perfect order and condition; £89/10.—Eloe Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [X]

1915 Harley-Davidson Combination, dynamo light throughout, speedometer, mileage 2,500, guns tested perfect; £65 cash.—Cave, Decorator, Widsao. [X]

HARLEY-DAVIDSON Combination, late 1915, little used, perfect condition guaranteed, tyres O a genuine bargain, £75.—P. Sparkes, 30, London Reigate. [X]

HARLEY-DAVIDSON, brand new, 1917 standard mag. model, khaki, special Harley Montague sidecar, magnificent combination; £135.—Parker's, 11 Shawgate, Bolton. [X]



## MOTOR CYCLES FOR SALE.

## Harley-Davidson.

7-9h.p. 1915 Harley-Davidson, electric model, speedometer, fitted with 18 gn. underslung sidecar, combination in very nice condition; sacrifice £70.—24, High St., Old Brompton, Chatham. [9426]

£50.—1915 7-9h.p. 3-speed Harley combination, new tyres throughout, tools, spares, 3 lamps, guaranteed perfect; first cheque secures.—Read, 1, Hare St., Bethnal Green, near Bishopsgate. [9577]

1916 Harley-Davidson and Harley De Luxe Sidecar, run under 2,000 miles, Palmer cord tyres, unscratched, Bosch mag., lamps, full equipment and spares, guaranteed perfect; £87/10.—Oram, Colin Park, The Hyde, Hendon, N.W.9. [9674]

HARLEY-DAVIDSON, two models C, with bulbous back sidecar, hood, screen, slightly soiled, £22/10; also brand new 1917 Canoelet Brown finish Watsonian lightweight, £20/18/6; also several others from £6/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9502]

HARLEY-DAVIDSON, 1917 7-9h.p. mag. model, with C. bulbous back sidecar, hood, screen, £130; also two 1915 mag. combinations, £68/10 and £73/10; also 1915 electric combination, £75; also 1916 electric combination, with genuine H.D. sidecar, £89/10; exchanges, easy payments.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9501]

## Hazlewood.

HAZLEWOOD 1915 Combination, 5-6h.p. J.A.P. engine, 3-speed clutch, and kick starter, Lucas lamps, speedometer, special sidecar; £72/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7475]

HAZLEWOOD-J.A.P., 1914, 5-6h.p. twin, 3-speed, clutch, kick starter, Lucas lamp and horn, Stewart mechanical horn, good condition, and fast; £43.—Barton, 90, Station Rd., Ashington, Northumberland. [X7392]

## Hobart.

HOBART, 1917, 2½h.p., 2-stroke, 33 gns.—H. J. Marston, 50, Argyle St., Birkenhead. [9471]

1915 Hobart Combination, 6h.p. J.A.P., Sturmer 3-speed countershaft, h.b.c., hood, screen, mechanical horn, and 3 lamps, overhauled, in fine order; £65.—W.W., 12, Althorpe Rd., Luton, Beds. [X7265]

## Humber.

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

HUMBER, 1915, 3½-4h.p. (water-cooled), mag., 3 speeds, kick, practically new; 38 gns.—Below. [X7475]

HUMBER, 1913, with coachbuilt sidecar, 3½-4h.p., mag., 2 speeds; bargain, £27/10.—Below. [X7475]

HUMBER, 1912, with sidecar, 3½-4h.p., mag., 2 speeds, only £23/10. exchanges entertained; also easy terms arranged.—Wardsworth Motor Exchange, Baer St., Wandsworth (Town Station). [9616]

1914 3½h.p. 3-speed Humber, lamp, etc.; £35, cash or easy terms.—R. E. Jones (Garages), Ltd., Swan Lea. [0863]

HUMBER, 3½h.p., 1913, F.E., very little used, complete; what offers? T. H. Gosling and Son, Reeves, Boston. [X7437]

Humber Twin, 1914, 3-speed, clutch, paraffin vaporiser, spare tank, 2 gallons of petrol; £20.—Barlow, 212, Sussex Rd., Southampton. [X7443]

1917 4h.p. Humber, flat twin, 3-speed, etc., brand new, only been 250 miles; a real bargain, £60.—Walbro, High St., Saffron Walden. [X7325]

1917 6h.p. Flat Twin Humber, 3-speed, with Cooper sidecar, value £27, screen, perfect condition guaranteed; £108; Lucas accessories.—K. Eveson, The Dingle, near Stourbridge. [X7455]

HUMBER, 1911, 3½h.p., 2-speed, handle start, 3 new lamps, belt, and silencer, roomy Montgomery sidecar, all in nice condition; £26.—Motor, 162, Park St., Haydock, near St. Helens. [X7376]

1917 Flat Twin Humber, 3½h.p., 3-speed countershaft, hand controlled clutch, T.T. bars, lamps, Stewart Warner tools, brand new condition; cost over £80 May, sacrifice; £65.—Brooke, 25, Newsome Rd., Huddersfield. [X7390]

## Indian.

INDIAN, 1915½, 7-9h.p. T.T., stored 21 months; £40.—Indian, A.C.S., R.F.C., Netheravon, Wilt. [X7367]

INDIAN, 1914, 7-9h.p., and sidecar, wire wheels, all accessories, excellent condition.—Christie Bros., St. Andrews. [9109]

INDIAN, 1914, 7-9h.p., Canoelet sidecar, splendid condition; £50, or offers.—St. James's Vicarage, New Cross, London. [X7337]

7-9h.p. Indian, clutch model, in splendid condition throughout, owner must sell, and will sacrifice at 30 gns.—Rowe, 140, Church Rd., Hove. [9626]

1916 5-6h.p. Indian, 3-speed, clutch, ridden 500 miles, Lucas lamps, etc., everything as new; bargain; £58.—Souderson, South Brink, Wisbech. [9482]

INDIAN Powerplus 1916 7-9h.p. 3-speed Combination, 73 gns., rare bargain; actually in stock; condition perfect, lamps, horn, speedometer; also 1915 late 1915 7-9h.p. clutch model, plating and enamel perfect; £55.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9500]



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1916 2½ h.p. ALLON, fully equipped ..... £25 0  
1917 2½ h.p. CALTHORPE-J.A.P., new, 2-speed ..... £39 18  
1912 2½ h.p. DOUGLAS, 2-speed ..... £25 0  
1916 2½ h.p. A.J.S., fully equipped, little used ..... £54 0  
1911 3½ h.p. T.T. TRIUMPH with Philipson pulley ..... £21 0  
1914 3½ h.p. T.T. ROVER with new Philipson pulley ..... £39 10

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## MOTOR CYCLES FOR SALE.

## Indian.

INDIAN Powerplus Combination, spring frame, electric lighting, just overhauled, not further required, bought car; £85.—Capt. Ridley, 111, Grosvenor Rd., S.W. [X7266]

INDIAN, 1916, 7-9h.p., 3-speed, spring frame combination, small mileage, original tyres; £65, or near offer for quick sale.—14, Chipley St., New Cross, S.E.14. [9533]

POWERPLUS 1916 7-9h.p. Indian Combination, practically new, condition unscratched; exceptional opportunity to secure the very best.—Telford Garage, 47, Streatham Hill, S.W. [9463]

1914 7-9h.p. Indian Combination, Phoenix coachbuilt torpedo sidecar, spring frame, Klaxon, speedometer, lamps, beautiful, perfect; £49.—Classens, 416, Richmond Rd., 1st Floor, Twickenham. [9479]

INDIAN Powerplus Combination, Dec., 1916, De Luxe £25 sidecar, discs to all wheels, 1,500 miles, fully equipped, as new; any trial or examination; £85, cost £115.—Landauer, 52, Shoot-up-Hill, Brondesbury, N.W. [X7351]

1916 7-9h.p. Powerplus Indian Combination, electrically equipped, spring frame, unscratched, and in perfect condition, T.T. handle-bars, also touring pair of bars; £98.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552]

EXCEPTIONAL Opportunity.—1916 7-9h.p. Powerplus spring frame Indian, Millford coach sidecar, dynamo lighting, electric horn, 3 lamps, speedometer, condition perfect; £80; letter for appointment.—135, Essex Rd., Leyton. [9407]

INDIAN Motor Cycle, 7-9h.p., red, 1914 model, 2-speed, new Dunlop studded tyres, had little use, and in excellent running order and condition, splendid sidecar machine, accessories; price £32/10, genuine bargain.—Archer, 4, Montague Hill, Bristol. [9649]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Indian, 1916, 2-stroke, 3-speed, clutch, kick start, 37 gns.; 1915 T.T. 7-9h.p. clutch Indian, 37 gns.; 1916 Powerplus 8h.p. 3-speed Indian, with sporting coach sidecar, disc wheel, 82 gns. (D) [9353]

INDIAN, 7-9h.p., spring frame, 2-speed, clutch, combination late 1913, low mileage, lamps, speedometer, Mechorn, mirror, good tyres, rear new, 1914 Indian O.B. sidecar, new hood, screen, smart turnout, excellent condition; £48, or exchange Morgan, cash adjustment.—Robins, 4, Churchways Crescent, Horfield, Bristol. [9427]

## Invicta.

INVICTA (new), 3½h.p., Abingdon King Dick engine, Sturmer-Archer 3-speed countershaft gear, clutch and kick starter, Dunlop tyres, Brampton forks, a very fine machine; £65/2; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9664]

## Ivy.

IVY, 2½h.p., 2-stroke, single speed, excellent condition throughout; £25/5; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7476]

## Ixon.

1915 Ixon, 2-stroke, Villiers engine, 2½h.p., a snip, climb anything; £18/10.—Jones, Garage, Broadway, Muswell Hill, N.10. [9520]

## James.

1914 4h.p. T.T. James, fixed engine; £27.—Graves, 56, Stoney Station Rd., Coventry. [X7377]

JAMES, 1916, 2-stroke, 2-speed, with accessories; £28, bargain.—Stour Cycle Depot, Stourbridge. [X7409]

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803]

JAMES 1916 Combination, 4½h.p., 3-speed countershaft, done 900 miles; £66; appointment.—Elsie Villa, Lansdowne Av., Leigh-on-Sea. [9627]

1914 James 4½h.p. Countershaft Combination; best offer over £35, or exchange and cash for higher power, Zenith preferred.—44, Cavendish St., Barrow-in-Furness. [X7310]

JAMES, 1916, 3½h.p. twin, 3-speed countershaft clutch, h.b. controls, all accessories, perfect; £47.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9552]

JAMES, 1917, 4½h.p., 3-speed, with James Canoelet sidecar, fitted with hood, screen, special silencer, new six weeks ago, sidecar never been out; cost £95, accept £80.—Bishop, 120, Mitella St., Burnley. [X7563]

JAMES and Sidecar, 1915, 4½h.p., Lucas dynamo lighting, Stewart speedometer, lamps, etc., £78; 5-6h.p. twin, 3-speed, countershaft, 80 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [X7468]

JAMES, the latest 1918 5-6h.p. twin, actually in stock, also 1913 4½h.p. solo model, £22/10, with accessories; also 1916 No. 6 combination, with special silencer under sidecar, speedometer, lamps, and horn, £75, like new.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9497]

## J.A.P.

1914 3½h.p. J.A.P., like new; £26; part exchange furniture, or anything useful.—Mount Pleasant, Lickfold Hill Rd., Rowledge, Farnham, Surrey. [9633]



## MOTOR CYCLES FOR SALE.

## J.A.P.

J.A.P., 4h.p., 3-speed, speedometer, sidcar; £38.—Nicol, 21, Lind St., St. John's, S.E. [9542]

## J.H.

J.H., 2-speed, new; £35/14; extended payments or exchanges.—Service Co., 292, High Holborn, London. [X7477]

J.H., 1917, brand new, 2½h.p., 2-speed countershaft, 2-stroke; 42 gns.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9550]

1916 J.H. (Villiers), 2-stroke, P. and H. lamps and generator, drip feed lubrication, footboards, etc.; £20.—Frearson, 36, Second Av., Mortlake, S.W.14. [9651]

## Levis.

LEVIS, late 1915, 2½h.p., 2-speed, first-class condition; £26.—75, Waterloo St., Lincoln. [X7394]

COLMORE Depots, Birmingham and Leicester, for delivery of Levis motor cycles from stock. [0804]

LEVIS, 2½h.p., less mag., in good order; £10; a bargain.—Manager, Old South Pier Lodge, Jersey. [X7164]

LEVIS, 2½h.p., late 1916, good condition, lamps, speedometer, horn; £25.—65, Mortlake Rd., Iford, Essex. [X7449]

LEVIS, 2½h.p., in fine condition, lamps, carrier, tyres new; £16.—Dixon, Providence Rd., Yiewsley, Middlesex. [9452]

1916 2½h.p. Levis, not done 800 miles; must sell; £22; condition as new; a bargain.—Northam, 6, Bank Buildings, Purley, Surrey. [9409]

2½h.p. 1915 Levis, Albion 2-speed, P. and H. lamp, 2 sets, Bosch waterproof, 2 belts, footboards, Lucas horn; £24, or nearest; owner called up.—Howard, 12, Nutbeam Rd., Eastleigh, Hants. [X7459]

LEVIS, 2½h.p., No. 1 Model, 2-speed, chain-cum-belt drive, rubber studded tyres, brand new, in stock for immediate delivery; reduced price £44.—Mabes and Mabes, 156, Gt. Portland St., W.1. [7564]

## Lincoln-Elk.

3h.p. Lincoln-Elk, Druids, Bosch, perfect; £12; must sell.—2, Oaktree Villa, Thames Ditton. [X7502]

BARGAIN.—Lincoln-Elk, and cane torpedo sidcar, 3½h.p., Bosch; £17/15.—Sheem, 16, Perrywood St., Fulham. [9407]

## Matchless.

MATCHLESS Motor Cycles from stock at Colmore Depots, Birmingham and Manchester. [0881]

NEW War Matchless Combination, Lucas lamps, and all fittings; £125.—Walbro, High St., Saffron Walden. [X7324]

MATCHLESS, 8h.p. Vindee Special, 2-speed, No. 5 Gloria sidcar, new condition.—Betts, 211, Newhall Rd., Sheffield. [X7450]

MATCHLESS 1917 War Office Combination, spare wheel complete; in stock; £120.—Parker's, Bradshawgate, Bolton. [X7495]

MATCHLESS Combination, 1915, 7-9h.p., torpedo sidcar, 3-speed, absolutely in perfect condition; only asking £75.—Ernest Parish, The Grange, Coggeshall. [X7388]

WE Can give immediate delivery of the 7-9h.p. War Office Model Matchless combination; £120.—Elee and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0480]

1917 Matchless Combination, brand new M.A.G. engine, 4 detachable wheels, Palmer tyres; £125; exchange entertained.—Seans, Dunn, and Jones, Bromley, Kent. Tel.: Bromley 350. [X6930]

1914 8h.p. Matchless-Jap Combination, coachbuilt sidcar, 2-seater, underslung, excellent condition, just overhauled, speedometer, lamps, horn, tools; bargain.—101, Kettlebaston Rd., Leyton. [9480]

MATCHLESS 1917 Combination, 8h.p., 3-speed, clutch, and kick starter, detachable wheels, including spare wheel, new; £120; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7478]

1917 Matchless SB2 Combination, with spare wheel and tyre, brand new, enamelled standard grey, M.A.G. engine, a splendid opportunity to obtain "the outfit" at once, £125.—1a, Bloomfield Rd., Plumstead, S.E.18. [X7399]

MATCHLESS (two) 1917 8h.p. J.A.P. Combinations actually here, £120 and £125 respectively, spare wheels in both outfits; easy payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9496]

1917 Brand New Matchless War Office Combination, fitted with 8h.p. twin-cyl. engine, smart finish, 3-speed countershaft gear, clutch, and kick starter, includes Palmer cord tyres, spare wheel and tyre; price £120; exchange or easy terms ¼ down.—Wanchope's, 9, Shoe Lane, Fleet St., London. [9613]

1914 Matchless Combination, 8h.p., 2-speed countershaft, all chain drive, new tyres, speedometer, lamps, spare covers, tubes, valves, etc., coachbuilt sidcar, Pillion seat, all in splendid condition, insurance policy, just overhauled at cost of £6/12; only reason of selling, owner bought car, and has not the room to store both, otherwise would not sell; price £55.—A.M., 9a, Tracton Rd., Bermondsey, S.E. [9416]

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## MOTOR CYCLES FOR SALE.

## Matchless.

1917 Matchless Combination, brand new, 4 detachable wheels, J.A.P. engine, war model, grand outfit; £120; exchange entertained.—Seans, Dunn, and Jones, Bromley, Kent. Tel.: Bromley 350. [X6931]

## Minerva.

3½h.p. Minerva; bargain, £16.—A.O., 167, Cotton St., 32 Peckham, S.E. [9421]

2½h.p. Minerva, mag. ignition, B. and B. carburetter, 14 new belt, good condition; £14.—Bryant, 18, Hampton St., Walthow. [9439]

MINERVA, 3½h.p., 2-speed, free, Whittle, Bosch, B. and B. lamps, Klaxon, torpedo tank, good condition; £12/15.—2, Osborne Rd., Thornton Heath, [9530]

## New Hudson.

NEW Hudson, 1914, 6h.p., 3-speed sidcar combination, very fine condition; £59/10.—Motor Exchange, Horton St., Halifax. [9246]

NEW Hudson 6h.p. Twin, 3-speed, coach sidcar, all accessories; £60; perfect.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9546]

1914 2½h.p. New Hudson-Jap, 3 speeds, Armstrong, clutch; bargain; splendid condition; £20.—Halliwell, White Gate, Edgeworth, near Bolton. [X7350]

NEW Hudson, 1915, 3½h.p., 3-speed, clutch, in good running order; £34/15; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7480]

NEW Hudson Motor Cycle, 1912-13, 3½h.p., 3-speed, clutch, in most excellent condition, new tyres, belt, lamp, Lucas horn; £30.—Butcher, St. George's, Olden-gate. [X7348]

6h.p. 1916 New Hudson, countershaft 3-speed model, clutch and kick starter, fitted with handsome coachbuilt sidcar, smart turnout, ready for the road; 70 gns.; guaranteed.—Wanchope's, 9, Shoe Lane, London. [9604]

1915 New Hudson Combination, big 6, Bosch mag., B. and B. carburetter, 3-speed gear, free engine, kick starter, clutch, lamps, horn, speedometer, coachbuilt, roomy, comfortable sidcar, chassis built by New Hudson, all tyres in excellent condition; £50; seen any time 119, Penton Rd., Vauxhall. [9523]

## New Imperial.

NEW Imperial, 1917, 2½h.p., 3½h.p., 6h.p. models, in stock.—Crow Bros, Guildford. [2563]

NEW Imperial, 1916, 2½h.p., 2 speeds, lamps, speedometer, many others.—Griffin's, 89, Gt. Portland St., W.1. [8935]

1917 Brand New 8h.p. New Imperial, War Office Model, and coach sidcar; 109 gns.—Motor Exchange, Horton St., Halifax. [9245]

NEW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0839]

NEW Imperial-Jap, 1916, 2½h.p., 2-speed, kick start, clutch, perfect; £44.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9551]

NEW Imperials, 1917 models in stock; 2½h.p. model J.A.P. engine, 2 speeds, 39 gns.; also clutch models with kick starters, one shop-soiled 2-speed model, 38 gns.—P. J. Evans, John Bright St., Birmingham. [9149]

NEW Imperial (new) 2½h.p., 2-speed; £40/19; actually in stock for immediate delivery; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9659]

NEW Imperial 8h.p. J.A.P. Overseas War Office combinations, as described in detail pages 252-3, Sep. 13th issue of this paper, exceptional machine in every detail; immediate delivery from stock; £114/9.—Colmore Depot, Distributors, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886]

## Norton.

NORTON, 1916 model, D.R.S., almost new; £37/10; speedy mount; guaranteed.—Wanchope's, 9, Shoe Lane, Fleet St., London. [9614]

3½h.p. T.T. Norton, Lucas lamps, Stewart horn, 32 Brooks saddle, spare belt, grips, polished engine, adjustable tappets, tyres good, tools, spares, rust, reliable; £45.—Hillary, The Peak, Easingstone. [9420]

## N.S.U.

N.S.U. 3½h.p. Twin, 2 speeds, and clutch, little used; 14 gns.—66, Greyhound Lane, S.W.16. [9591]

6h.p. N.S.U. Twin, Bosch, property of officer ordered abroad; £14, quick sale.—Capt. Bachelor, 93a, Brighton Rd., Surbiton, S.W. [X7303]

1909 N.S.U. 3½h.p. Motor Cycle, mag., carburetter warming device, new valves, piston rings, good running order; £8.—Baker, Howey, Llandrindod Wells. [9623]

HAVING Acquired the entire stock-in-trade of the N.S.U. Motor Co., Ltd., we can now supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Eagles and Co., Acton Hill Works, Acton, W.3. [X7451]

## O.K.

O.K., 2-stroke, nearly new; £16; single gear.—21, Tindal St., Chelmsford. [9648]



# THE MOTORCYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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## The Use of Coal Gas.

**N**OW that official sanction has been obtained from the Ministry of Munitions for the use of gas in motor vehicles, provided the gas is carried in bags at, say, slightly above atmospheric pressure, and not in steel cylinders, a certain load may be lifted from the minds of motor cyclists, but the statement that "if motorists were to use coal gas on any considerable scale it might become necessary to impose certain restrictions upon its use" has a somewhat damping effect upon the seemingly cheering tenor of the first part of the statement.

It is conceivable that the chief reasons why petrol and allied fuels have been so severely restricted are first the desire to curtail imports, and second the needs of the nation. The same reasons cannot apply to coal gas. It is a home-produced fuel, and in its manufacture numerous extremely valuable by-products are made which are so badly needed that we have been told that the more coal gas is used the better the Government is pleased.

The statement, therefore, seems to suggest that any restrictions on the use of coal gas would be made, not with the idea of saving precious commodities, but merely to prevent motorists from being seen on the road. Such a state of affairs would be grossly unjust.

At the present time coal gas can be used only for short distances, but so inestimably useful are motor cycles that if it is possible to use them at all motor cyclists will make a great effort to do so, and often for purely private purposes.

There are numerous uses to which a motor cycle may be put which cannot be counted to be strictly business or of national importance: so long therefore as there is a means of using machines without fear of prosecution considerable efforts will be made to employ them for such purposes. We sincerely hope, therefore, that the motoring organisations will see that motorists are adequately protected, and that the use of coal gas will not be maliciously

restricted unless it is really found that it in any way interferes with the prosecution of the war.

The concession that gas may be used in bags slightly above atmospheric pressure is something to be thankful for, but the flexible bag cannot be said to be ideal. It is far too bulky, and, as previously stated, does not contain more than a meagre supply. The carrying of gas under pressure, therefore, seems to be the final solution of the difficulty, but a good deal has to be learnt, as the present-day cylinders are too heavy and quite impracticable for solo machines. Something may be done in the way of a specially light and carefully strengthened cylinder, or in the development of the Wood-Milne rubber fabric cylinder, but both these inventions are in their infancy. It is sincerely to be hoped that if the demand for steel in any way decreases, owing to the fact that we are well up in the manufacture of munitions, the Ministry will release at any rate a certain amount of steel for experimental purposes, and not act in any way that may hinder development or improvement in design.

## A Sporting Test.

**T**HE test that we describe elsewhere in this issue must not be regarded as a sporting event pure and simple, although the sporting element was by no means lacking. It is, however, very desirable that divergent opinions on important subjects should be settled by experiment, and the debatable question whether a 4 h.p. single-cylinder sidecar outfit could hold its own over a certain type of course against a machine of nearly twice its capacity could be settled in no other way. Both machines were magnificently handled, and both performed with the greatest credit to themselves. Such a test cannot be considered to be a waste of petrol, and even if it were the quantity consumed was no more than is often used to wash down a lorry engine and the hands of the mechanics.



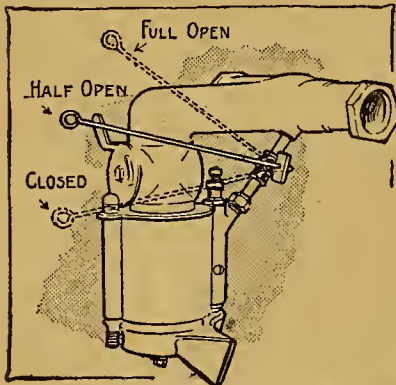
# IDEAS: Useful and Ingenious.

Sydney R. Jones



## TIP FOR INDIAN OWNERS.

I WOULD like to give Indian riders a very good tip to produce slow running when running engine light. I have soldered an ordinary gas tap into the pilot pipe, and when the engine is warm, by turning this tap about half off, I get a beautifully slow tick-over with absolutely no vibration. Before I was able to regulate the pilot the engine



Showing tap and pilot pipe fitted on the carburettor of 5.6 h.p. Indian.

would race, and I could not leave the engine running when the machine was on the stand. I can also use the engine as a brake for coasting by shutting the pilot completely off, thus saving petrol, brakes, and clutch. It is a great improvement, and I cannot understand why it is not fitted as standard by the makers. My Indian is a 1915 5.6 h.p. T.T. model, three-speed clutch.—C. S. RAWLINS, Rugeley.

## TWO USEFUL TIPS ON ACETYLENE.

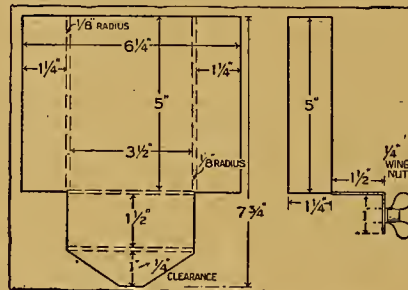
ACETYLENE gives a pretty brilliant light in the ordinary way, perhaps a little too brilliant for the police regulations in some districts just now. The brightness of the flame can be still further increased if desired by adding a little peroxide of hydrogen to the water in the generator. A teaspoonful to half a pint of water will be found sufficient.

Another tip worth knowing is to put a lump of sugar in the water before pouring into the container. Cane sugar, or saccharose, forms a chemical compound with lime—produced by the action of water on carbide—and the resulting calcium saccharate prevents much of the corrosion to which the generator and connecting tubes are subject. The sugar does not impair the brilliancy of the light, nor in any way interfere with the production of the gas.—H. J. GRAY, Lewes.

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Contributions will be paid for at our usual rates. Rough sketches will suffice.

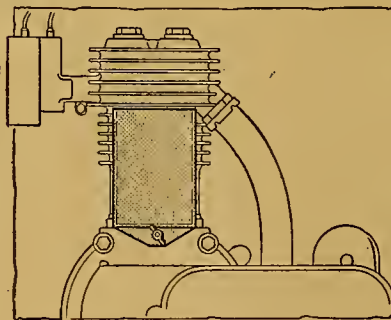
## DESIGN OF VALVE COVER FOR TRIUMPH.

A SIMPLE, efficient valve cover can easily be made for use on a counter-shaft Triumph from a sheet of aluminium or copper. The only necessary



Pattern and measurements for Triumph valve cover.

alteration for the fitting of this cover is an extension to the rear timing case cover stud nut (about lin. of  $\frac{1}{4}$  in. screw Whit., which can be soldered,

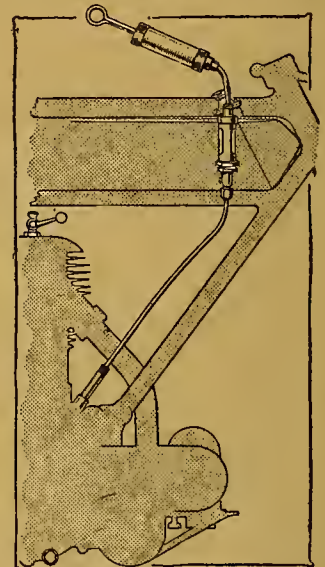


Valve cover in position on W.D. Triumph.

brazed, or welded in place); the cover is then kept in position by a  $\frac{1}{4}$  in. spring washer and wing nut, making it quickly detachable. A very neat finish is given to the machine if the cover is neatly made and subsequently polished, and the valve stems are effectively preserved from grit.—J. MANZANO.

## SWILLING OUT THE CRANK CASE.

WHEN necessary to swill out the crank case with paraffin, I found it very inconvenient and troublesome to have to remove the oil pipe on my machine (a  $4\frac{1}{2}$  h.p. B.S.A.) for the purpose of injecting the necessary paraffin, and then to have to replace it when the simple job was finished, and have found the following method very



An idea for facilitating the swilling out of a crank case.

simple and effective: Remove the regulating screw from sight feed and insert squirt as shown in sketch. Having pumped in two or three charges of paraffin, give kick starter a few turns and remove drain plug in bottom of crank case, when spent oil will be completely washed out.—GEORGE E. BARR, Paisley.

## MAGNET FINDS SMALL SCREWS.

FOR some time past it has been the writer's custom to carry a magnet when out on the motor bicycle. Small screws, if dropped in the road while effecting some minor adjustment, can be readily found and picked up with a magnet, however dark the night may be and when the wind is too high to effect the search with the aid of a match. For convenience a steel spanner was made to do duty as a magnet, the services of an electrical friend being requisitioned to magnetise it as powerfully as possible.—H. J. GRAY, Lewes.



# Occasional Comments

by "Ixion"



## Weight per Horse-power.

IT is a great pity that cost may prevent much of the war advance in petrol engineering from being translated into terms of motor cycling. I have not weighed many motor cycle engines, but the last modern  $3\frac{1}{2}$  h.p. which I saw upon the scales tipped the beam at 56 lb. and developed about 5 h.p. on a bench test; in other words, it weighed 11.2 lb. per h.p. Now the 260 h.p. Mercédès, according to one of our occasional contributors, is regarded as rather a dray-horse type of aero engine, designed and built for prolonged hard usage, and it weighs approximately 1,090 lb. or 4.2 lb. per h.p. Even this ratio suggests a potential  $3\frac{1}{2}$  h.p. motor cycle engine weighing no more than 15 lb. or so; but to get the full value of the modern weight reduction, we should compare the motor cycle engine not with the more ponderous and water-cooled types, but with the rotaries and radials. I do not know, and if I did know might not say, exactly what power to weight ratios are now attainable in the lighter types, but I understand that aero engines expect to get down to  $1\frac{1}{2}$  lb. per h.p. before the next war, and that implies a conceivable motor cycle engine of  $3\frac{1}{2}$  h.p. weighing just over 5 lb. The previous best is the 4 b.h.p. flat twin A.B.C. weighing 22 lb.; and the theoretic advance is greater than these figures indicate, seeing that the tiny A.B.C. engine only gets its power by a colossal rate of revolutions per minute, whereas the aero engines under notice are slow speed engines with a presumed maximum revolutions per minute of 1,500 or so.

## Chassis Weight.

WHEN we turn to the weight of the frame and fittings we can draw no direct analogy from aeroplane construction, but we can dwell on the Frontenac racing car which develops 135 b.h.p. and weighs 14½ cwt., i.e., evinces a weight reduction of from 30% to 50% on previous practice in the same line. Adding the two lines of progress together we get a dream picture of a  $3\frac{1}{2}$  h.p. Triumph scaling no more than a Baby Levis and developing about double the power.

## Impracticable?

THIS theoretic motor cycle is a wild impossibility at the present moment. To begin with, all the constructions which form our data for it are built regardless of cost. The Frontenac car cost its builders several thousand pounds. The average aero engine probably costs no more per h.p. than the average motor cycle engine, and some cost considerably less; but this basis of comparison is illusive, as two cylinders, giving respectively 30 h.p. and 3 h.p. apiece, cost much about the same. The real crux is the fact that one can get these very light engines by employing a huge number of cylinders, sharing a short crankshaft; and the 5 lb.  $3\frac{1}{2}$  h.p., if it were built, would be, for example, a nine-cylinder rotary, would cost almost as much as a 100 h.p. rotary, and would

be far less satisfactory, because a minute air leak would wreck its carburation. Again, the Frontenac car is light in weight, because it has proved possible to replace dozens of parts, large and small, which carry no transmission stresses, by lighter materials; and such parts are absent on a motor cycle. We may ultimately get the 100 lb.  $3\frac{1}{2}$  h.p. motor cycle, but we are very little nearer to it than when war broke out.

## A Suggested Referendum.

AN officer, writing from France, suggests an improvement on the referendum proposed by other E.F. correspondents on the respective merits of the flat twin and vertical single. So far as machines used by D.R.'s are concerned, the relative merits of the two types of engine cannot be compared, seeing that the comparison is stultified by the contrast being limited to one sample of each engine, by the abnormal riding conditions, by possible differences in the general standard of workmanship, by the variation in horse-powers, and by other factors, amongst which the writer includes a theory that much of the oil issued in France is ill-suited to small high speed engines. In lieu of the original proposition, which was obviously ridiculous, he suggests a referendum amongst our readers as to which of the following specifications they prefer:

(a) A high speed engine which depends on a high rate of r.p.m. and low gearing to develop its road efficiency.

(b) A low speed engine which can stand high gear ratios.

## The Proposal Examined.

I AM inclined to think that this suggestion is almost as fallacious as its predecessor, in so far as its aim is to distinguish between the flat twin and the vertical single. The tendency towards low gears and high revolutions is not a peculiarity of the flat twin, but stamps most modern engines. For example, in 1901 I owned a  $2\frac{3}{4}$  h.p. single, which was geared 4 to 1, and pulled pretty well on that gear. The original  $2\frac{3}{4}$  h.p. Douglas slugged away at low revolutions on its top gear much more manfully than those I have owned lately. My first  $3\frac{1}{2}$  h.p. Triumph was delivered with a  $4\frac{1}{4}$  gear—my last with a  $5\frac{1}{4}$  gear; and I have owned two 500 c.c. flat twins which pulled on high gear as doggedly as any single. The tendency to substitute lower gear ratios and increased maximum revolutions seems to me to be quite independent of engine types and to be common to all modern engines, except the aero engine, in which a limit of 1,400 r.p.m. is imposed on ungeared engines, and a limit of 2,000 r.p.m. upon geared engines, for reasons which do not affect road work. The public seem to have endorsed the craze for revolutions pretty heartily; the average owner is rather proud of any special revving ability his engine may possess; and one hears few people complain that their engines run too fast.



# DARTMOOR as a TOURING GROUND

Some Account of  
the Roads, Beauties,  
and Antiquities of  
South Devon.

By H. TAPLEY-SOPER.

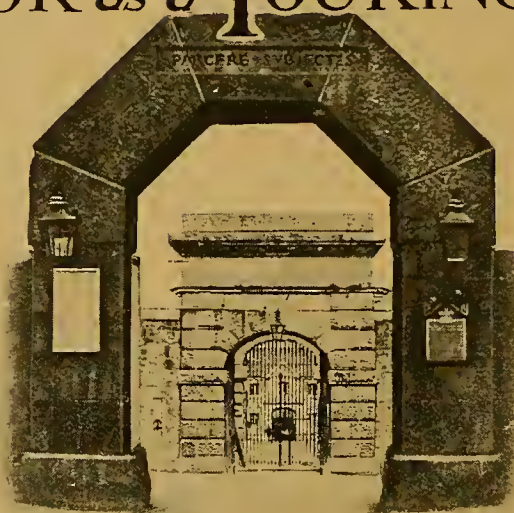
FOR our third Dartmoor tour we follow the same road as traversed in the second tour as far as Chudleigh Knighton, then straight on to Ashburton. Although this is one of the fastest stretches in Devon, the rider will be well advised to "keep his weather-eye open" for a couple of busy by-roads which intersect the main road.

The forest of chimneys on the right mark the Heathfield Potteries, where much of the quaint Devon china is made. On the left we pass the massive entrance lodge to Stover Park, the seat of Harold St. Maur, Esq.; and about three miles further on we run through the village of Bickington, which has an old church and churchyard with a curiously wrought lych gate amongst its features of interest.

Ashburton is a quiet and dignified old country town, situated amidst most beautiful scenery and containing some fine old houses. A drinking fountain adorns the centre of the town—formerly the site of the Bull Ring, where the three principal streets meet.

## The Stannary Towns.

In the year 1285 Edward I. made Ashburton a Stannary Town, and she thus shared with Chagford, Plympton, and Tavistock the important privilege of weighing and stamping the ingots of tin raised from the surrounding mines. From the earliest times the tin mining districts of Devonshire and Cornwall appear not to have been subject to the common laws of the kingdom; they were governed by the Stannary Parliament, which exercised special jurisdiction apparently more suitable for this part of the land. These privileges included the right of life and death or imprisonment in the castle of Lydford. The Stannary Parliaments for Devon were at first held in the open air upon an elevated spot called Crockern Tor, near Two Bridges, which was referred to in our first tour, "Till within the memory of man the commission was opened and the jurors sworn upon this spot, after which the court was adjourned to Ashburton or one of the other Stannary Towns." The earliest document in connection with the powers of the Stannary Parliament is a Charter of Richard I. dated 1198, but the origin of these laws is quite unknown. The rule of the Stannary Parliament was very stringent, and it is recorded that one of its most drastic enactments was to the effect that any tinner convicted of mixing impurities



Entrance gate, Princetown Prison.

*Previous instalments (including a map of the district) appeared on August 16th and September 13th.*

with his metal was to have three spoonfuls of it poured down his throat in a molten state.

In the sixteenth century Ashburton enjoyed considerable prosperity in connection with the woollen industry. In 1646 the town surrendered to Sir Thomas Fairfax, who established himself at the Mermaid Inn, which still stands at the corner of North Street.

Many of the French prisoners detained in England during the early part of the last century formed Lodges and Chapters of Freemasons in England, and the prisoners on parole from Dartmoor prison initiated one at Ashburton called "Des Amis Reunis." The church of St. Andrew is said to have been founded in 1137. The present building, which includes a fine tower 90ft. in height, dates from the fifteenth century. One of the principal monuments in the church is to the memory of John Dunning, a native of Ashburton. It bears the following inscription, written by the great Dr. Johnson, who was a frequent visitor to Devonshire:

In memory of  
JOHN DUNNING, LORD ASHBURTON,  
A native of this Town,  
Who by his private virtues  
United with the exertion of rare and excellent talents,  
Rose to that pre-eminence  
which neither birth nor titles can bestow.  
He died 18th August, 1783. Aged 51

## Sharp Practice.

A good story is told of Lord Ashburton by Baring-Gould in "Old Country Life." Dunning was defending a scion of a local family who was given to playing for high stakes. One day he had been gambling till late, and had lost every guinea he had about him. Then he rode off, put a black mask over his face, and waylaid the man who had won the money of him, and on his appearance challenged him to deliver. The man recognised him, and incautiously exclaimed, "Oh! Edward St. Pierre, I did not think this of you!" "You know me, do you?" was the reply, and Edward St. Pierre shot him dead. Now there had been a witness, a man who had seen Capt. Edward take up his position, and who, believing him to be a highwayman, had secreted himself, and waited his time to escape. Edward St. Pierre was tried for murder.

Dunning of Ashburton, then a rising lawyer, was retained to defend him. It was essential to weaken



**Dartmoor.—**

or destroy the testimony of the witness. Dunning had recourse to an ingenious though dishonest device. The murder had been committed when the moon was full, or nearly full, so that in the brilliant white light every object was as clear as day. Dunning procured a pocket almanac, removed the sheet in which was the calendar of the month of the murder, and had it reprinted with exactly similar type, altering the moons so as to make no moon on the night in question.

On the day of the trial he left this almanac in his greatcoat pocket, hanging up in the ante-room of the court. The trial took place, and the witness gave his evidence.

"How could you be sure that the man on horseback



Princetown church, built by French and American prisoners.

was Capt. St. Pierre?" asked the judge.

"My lord, the full moon shone on him. I knew his horse; I knew his coat. Besides, when he had shot the other he took off his mask."

"The full moon was shining, do you say?"

"Yes, my lord; I saw his face by the clear moonlight."

"Pass me a calendar. Who has got a calendar?" asked the judge.

At this time almanacs were not so plentiful as they are now. As it happened no one present had one. Then Dunning stood up, and said:

"My lord, I had one yesterday, and I put it, I think, in the pocket of my overcoat. If your lordship will send an apparitor into the ante-room to search my pocket it may there be found."

The calendar was produced; there was no moon. The evidence against the accused broke down, and he was acquitted!

Leaving Ashburton by West Street, about three-parts of a mile out, we avoid the Plymouth and Totnes

road, which bears off to the left, and make for Holne Bridge, which about a mile on suddenly breaks away on the near side. In 1912 the Jarrott Cup course included this route for the first time. It was a pleasant spring morning, and I well remember standing by Holne Bridge, watching the almost reckless approach of the competitors, and to this day wonder at the miraculous escape of one rider who came pelting along oblivious to the fact that he had to cross the river. A shout from the eager bystanders awoke him to his danger. With a sharp tug at his handle-bars and a dry skid he directed his machine across the narrow bridge, and finished up against the parapet with a thud that knocked him dizzy and nearly precipitated him into the river. With the assistance of the friend with whom he was riding he straightened his foot-rest, discarded the remains of his mirror, directed the attention of his battered head lamp from the saddle to the road, and pluckily negotiated the famous hairpin bend which was waiting for him around the corner.

But the hairpin will not trouble us to-day, for, as described and illustrated in *The Motor Cycle* of July 13th, 1916, the road has been diverted, and now, after crossing the bridge, turns to the right and runs parallel with the river. This is a charming spot for



Princetown from the meadows.

an open air meal, which can be taken with a draught from the River Dart, which here rushes along through one of the most exquisite spots of its course.

Although, as we have remarked, the Holne Chase hairpin no longer remains "to put the wind up us," there is still the steep hill beyond to negotiate—a hill which caused many a competitor's engine to "konk out" through the rider having relaxed his attention in the belief that having got round the hairpin there was nothing more to trouble about. Drivers of heavy combinations are advised to drop into bottom gear for this rise, and to make up their mind before they start which road they intend to take when they get to the top.



**Dartmoor.—**

A glance at the map published on September 13th shows alternative routes. The subsidiary road to the left runs through the old-fashioned village of Holne which, in 1819, gave birth to Charles Kingsley, the author of "Hereward the Wake," "Water Babies," and many other well-known books. From Holne we climb up to the reservoir of the Paignton waterworks, which makes this part of the moor reminiscent of Switzerland. From here to Hexworthy Bridge past the Forest Inn and down over what is known locally as Hexworthy "Corkscrew" is no place for nervy drivers or any but experienced riders having powerful and well-found outfits.

I mention this deviation from the main road on account of its great beauty and interest for those who have sufficient confidence to try their skill at some difficult driving.

If the main road is selected, we drop down a steep hill to New Bridge which here spans the river.

As a halt is imperative for opening a gate, it gives us an opportunity of enjoying the delightful setting of this spot. If the legs require stretching there is a beautiful walk of about half a mile through a semi-private road, entered by a gate opposite a couple of cottages on the right, just before approaching the bridge; or, if one cares to spend a few hours here, nothing could be finer than an after-lunch ramble through the fairy-like Holne Chase woods.

Leaving New Bridge, we proceed up the hill and bear away to the left for the little village of Pounds Gate; and about a couple of miles further, again take the left fork, eventually emerging on to the main road at the top of the well-known Dartmeet Hill—the longest and steepest hill on the moor's main roads.

On the left going down should be noted the Coffin Stone, on which for many generations the bearers have rested denizens of the moor on their last journey to Widdecombe churchyard. The scenery around is of the grandest character, and at the foot of the hill where East and West Dart meet the trees overhanging the trout and salmon-laden streams present a scene not quickly forgotten.

**A Pre-war Knut.**

It was at the bottom of this famous local hill that the writer on a placid summer's evening came across one of those pre-war specimens yclept the "Knut." There he sat by the roadside, his brand new machine, of a well-known and expensive make, on the stand; between his lips a fragrant cigarette, his unprotected clothing and smart brown shoes liberally besprinkled with dust, his hands encased in chamois leather gloves.

"Can't start her, can't you?" "Only had her three days." "Um!" "Came down the hill, I suppose, with air open and throttle closed?" "Oh, yes, they told me to give her plenty of oil when I bought her." "No, I haven't looked at the plug—does it come out?" "A spanner? Oh, yes, there *are* some tools in a bag—shall I undo them?" And, regardless of his gloves, but careful of his soft, white hands, he produced a roll of first-class tools such as but few makers send out.

While I cleaned his plug he looked on in a casual way with an air of boredom. "Now try her"—and he did. Half-way up the hill he waved his hand, and that was the last I saw of him, but to the present day I cherish the spanner which in the ordinary way would have been replaced in his tool roll when he came back to express his thanks. If the war has spared him, and I hope it has, he is several years older, and may now appreciate a good spanner. It is still in excellent condition, and at his service if he will send his name and address to the Editor.

Just after crossing the bridge at Dartmeet (thirty miles) a right-hand swerve on a stiff gradient confronts us, but having negotiated this we have practically a straight fast run over rather desolate moor until we join the Moretonhampstead road just above Two Bridges (thirty-five miles), which we visited on our first tour. This time, after passing over the bridge, instead of turning off to the right for Tavistock, keep straight on up over the hill into Princetown, about two miles further on.

Shortly before joining the Moreton road will be noticed amongst some trees on the left the entrance to

Prince Hall, named after George IV. when he was Prince of Wales, and built by Sir Thomas Tyrwhitt, Usher of the Black Rod, Warden of the Stannary and Steward of the Forest, who, as Baring-Gould in his interesting "Book of Dartmoor" says, fondly supposed he had discovered an uncultivated land which needed only the plough and some lime to make its virgin soil productive. But those who followed his advice soon found that the draining of bogs drained their pockets much faster than the mires.

However, near this spot the Duchy officials of our present Prince of Wales have recently started an ambitious scheme of reclamation by which it is hoped that, profiting by past experience, greater success will be attained.

Readers of Eden Phillpotts's "American Prisoner" will recall old Malherb, who is portrayed as one of the victims of Tyrwhitt's belief in the potentialities of the moor.

Princetown occupies what is perhaps the most bleak and forbidding spot on the whole moor, and the layout of the town, with its barrack-like warders' dwell-



The river above Dartmeet.



**Dart moor.—**

ings, accentuates its unattractive character. Over the prison gate is the inscription *Parcere subjectis*—a mutilated quotation from Virgil who wrote *Parcere subjectis et debellare superbos* (To spare the conquered and subdue the proud).

If any place is calculated "to subdue the proud" and to eliminate the last spark of human sympathy Princetown and its prison buildings are well designed for the purpose. Had it not been for the war between France and England, which broke out in 1803, it is more than probable that the site of Princetown would have remained in its pristine state. Accommodation was required for the large number of prisoners of war, and as a result of Tyrwhitt's representations prison buildings were begun in 1806, to relieve the congestion which existed in the hulks at Plymouth.

The selection of the site and the early history of this establishment are another tale of a great Government muddle, too long to relate here in detail, but which can be read in an interesting volume entitled "The Story of Dartmoor Prison," by Capt. Basil Tomson, who was for some years the prison governor.

Tyrwhitt having gained his end, mistakes were next made with the building contracts, which occasioned such delays that, before any part of the prison was available for occupation, repairs and replacements were necessary. The roughness and scamped character of this early work is testimony of the adage that the lowest contract price is not always the cheapest.

It was not till May, 1809, that the first draft of 2,500 men marched up from Plymouth and occupied the first block erected. This consisted of five prisons disposed in a semi-circle radiating from a common centre built at a cost of £74,000. Since then many alterations have been made, but the main gate and the surrounding walls enclosing about thirty acres formed part of the original buildings. In addition to the large number of prisoners originally packed into these buildings there was a garrison of 500 soldiers, which was afterwards increased to 1,200 as a result of disturbances created by the Americans. Shortly afterwards the guard was supplemented by a detachment of artillery. At this period the prison contained 9,000 French and American prisoners.

**A Slipping Clutch.**

The history of the prison during its period of occupation by war prisoners is one of gross mismanagement—harsh and brutal treatment by the officials, cheating by the food contractors, and the acceptance of bribes by the guards led to riots, and warders were attacked and murdered. Elaborate attempts at escape were hatched by the prisoners, and in several instances were within an ace of success. Of individual escapes the one that will appeal most to motor cyclists concerns a man named *Clutch*, who was so "lightly constructed" that he "slipped" through the iron bars of the window on the ground floor of No. 3 prison. Waiting until the sentry turned on his beat he quickly "took up the drive" and made for the boundary wall, which he scaled by digging his fingers and toes into the interstices between the stones. After enjoying a few days in the "free position" he was carefully "readjusted" and "bolted up solid" as a "single unit."

Early in 1816 the last of the war prisoners departed from Princetown and the prison was closed and left to fall into ruins. The church, built by the French and American prisoners, also became ruinous; the population of the town dwindled away; and the streets were filled with weeds. For a time the prosperity of Princetown became a thing of the past. From 1831 the town enjoyed a further short spell of success as a result of the revival of the granite industry, and in 1847 the prison buildings were leased to a company to extract naphtha and other chemical products from Dartmoor peat, but the venture soon died out as the quality of its output was not up to expectations.

In 1850 the buildings were again taken over by the Government and converted into a convict prison.

After the outbreak of the present war the average complement of a thousand convicts gradually dwindled, and last year the buildings were turned over for the housing of Conscientious Objectors, towards whom the residents of the neighbourhood are, if anything, less kindly disposed than to the previous tenants. Capt. Tomson, in his book already referred to, relates, amongst other tales, one concerning the motto *Parcere subjectis*. A warder who had shown a visitor over the prison was asked for an interpretation of the legend over the gate. "I don't know the exact words," was the reply, "but it is Eytalian, and it means if you once get in, you don't get out again."

**Child's Tomb.**

Nearly three miles across the moor, behind Prince Hall, is Child's tomb. The legend of Child is preserved in a local ballad which I quote as a warning of the dangers of Dartmoor.

It so befell, as I've heard tell,  
There came the hunter Childe,  
All day he chased on heat and waste,  
On Dart-a-moor so wild.

The wind did blow, then fell the snow,  
He chased on Fox-tor mire;  
He lost his way, and saw the day,  
And winter's sun expire.

Cold blew the blast, the snow fell fast,  
And darker grew the night;  
He wandered high, he wandered low,  
And nowhere saw a light.

His knife he drew, his horse he slew,  
As on the ground it lay;  
He cut full deep, therein to creep,  
And tarry till the day.

So with his finger dipp'd in blood,  
He scrabbled on the stones—  
"This is my will, God it fulfil,  
And buried be my bones.

"Whoe'er-he be that findeth me  
And brings me to a grave,  
The lands that now to me belong,  
In Plymstock he shall have."

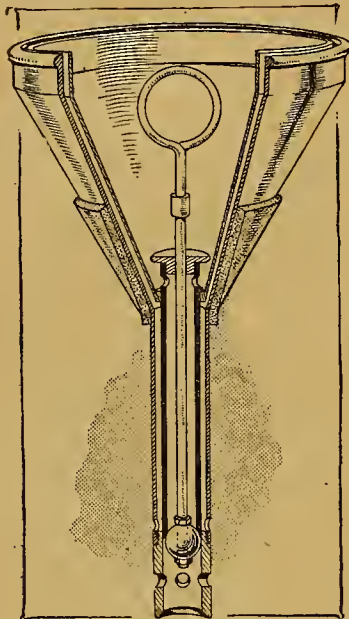
There was a cross erected then,  
In memory of his name;  
And there it stands, in wild waste lands,  
To testify the same.

The legend further relates that when the monks of Buckfast heard of this they set out to remove the body to their monastery. But the monks of Tavistock, acting with greater speed, threw a bridge, which became known as Guile Bridge, over the Tavy, and carried the dead hunter to their abbey and in due course claimed his lands.



## A FUNNEL TO PREVENT PETROL WASTE.

WE have recently made a test of a patented funnel designed to prevent the waste of fuel. This funnel is made in two patterns, one of which we illustrate. The principle of both designs is as follows: Around the neck of the funnel is a cone-shaped piece



A funnel designed by J. Haigh, Glossop, and so arranged that petrol cannot overflow the tank should the funnel contain petrol after the tank has been filled.

of soft rubber, which when pressed down into the petrol orifice makes an airtight joint. Fuel is then poured into the funnel until the air trapped in the tank prevents further ingress. The depth to which the tank is now filled depends upon the length of the stem, and this can easily be arranged so that the remainder of the fuel in the funnel will not cause the tank to overflow. Moreover, in the pattern illustrated, if the funnel be lifted out by means of the ring, the bottom is closed by a rubber ball attached to the rod, and the fuel in the funnel can be returned to the can. In practice, we found both designs quite satisfactory, but if used to fill a tank which has a needle valve running through it the air cannot be trapped, and consequently the level must be checked in the ordinary way.

The inventor is Mr. J. Haigh, 44, Cowbrook, Glossop.

## BRITISH IMPORTS AND EXPORTS.

NO complete motor cycles were imported during September, and the quantity of spares and tyres which arrived was negligible, amounting only to £1,144. This is a £1,000 decrease on the August figures.

In September, 1916, our imports of motor cycle tyres and accessories amounted

to £9,215, and for the same month in 1915 (including, of course, complete motor cycles) £30,126.

### BRITISH EXPORTS FOR SEPTEMBER.

Our exports are fairly well maintained, though showing a considerable reduction compared with the figures for August. It will be observed that there is an increase on both 1915 and 1916 for the corresponding month of September.

	1915	1916	1917
Number of motor cycles	637	746	952
Value of motor cycles, parts, tyres, accessories	£52,188	£59,830	£79,006

### PETROL FIGURES.

Number of gallons imported for Sept.:

	1915	1916	1917
	9,879,103	13,552,420	13,278,972

The number of gallons imported during the nine months of this year was:

January	.. ..	13,061,740
February	.. ..	12,257,984
March	.. ..	9,246,546
April	.. ..	10,258,951
May	.. ..	12,270,934
June	.. ..	11,327,434
July	.. ..	12,346,846
August	.. ..	7,853,368
September	.. ..	13,278,972

\* The total quantity of petroleum (including petrol) imported during September was 84,814,203 gallons.

## THE MOTOSCOPE.

THIS is an American invention, consisting of a metal bushing containing three glass windows, which is screwed into the sparking plug orifice and carries the plug. One is intended to be placed in each cylinder in turn, or



An American plug designed for use when testing engines.

or a set may be used during the time the engine is being tested and adjusted. By examining the colour of the explosion through the window, it may be seen how the engine is running. A correct mixture is shown by a regular, blue flame; a rich mixture is shown by a yellow flame; a weak mixture by a weak flame. Cylinders which misfire or do not fire at all can be also detected. Excess of oil is shown by small particles of yellow flame. The device, which is only intended to be used when the engine is being tested, is sold by the Detroit Accessories Corporation, 419, Hillger Avenue, Detroit, Michigan, U.S.A.

## THE FIRST MOTOR BICYCLE IN IRELAND.

IN *The Motor Cycle* of October 4th we published a paragraph to the effect that Lord Garvagh, better known to our readers as the Hon. Leopold Canning, had been granted a commission as equipment officer in the R.F.C.

Recently the *Dublin Evening Mail* made the statement that Lord Garvagh was the first motor cyclist in Ireland, which evoked a protest from Mr. F. A.

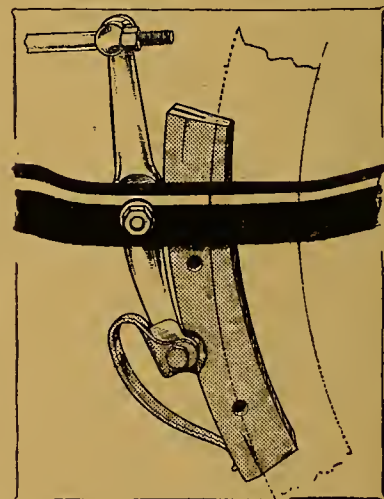
Wallen, of Dublin, who laid claim to that honour. The *Dublin Evening Mail* now admits that the paragraph in question was taken from the *Irish Cyclist*, and it is pointed out that this journal states that Mr. F. A. Wallen, of Dublin, has admittedly proved his right to the distinction of being the first person to use a motor bicycle in Ireland.

The Dublin evening paper publishes an account of an interesting interview with Mr. Wallen, from which we learn that when travelling to London in November, 1900, he met in the train a Belgian engineer, M. De Jong, of Autwerp, and in the course of a conversation learnt that the latter proposed to exhibit a motor cycle at the forthcoming Crystal Palace Show. Mr. Wallen subsequently met Mr. De Jong at the opening of the show by appointment, and rode the machine round the Palace grounds, and the same day he asked Mr. James Bayliss (now managing director of Perry Motors) if he would build him a motor cycle, using De Jong's engine, which was the early Minerva. Mr. Wallen supplied particulars of design and specification later, and the machine was delivered to him in the following January.

"I do not forget," he relates, "my first day with it. I took it to the Park, but it was not willing to bring me home. I was ten hours—from eight o'clock to six—overcoming its reluctance, but finally succeeded. It proved very satisfactory afterwards. Some time later a photograph of it appeared in one of the sporting papers, and enquiries and orders began to come in that year and next."

In the autumn of 1902, he states that he asked the Triumph Co. to make motor cycles for him, to which they agreed, and the first was exhibited at the London show in November, and delivered to him in Dublin later. Orders flowed in, and practically the whole of the Triumph output for that year went to Dublin.

"Such," states Mr. Wallen, "was the beginning of the British motor cycle industry."



The improved pattern of Triumph rear brake. A compensating spring has now been added.





## Discarding the Spark.



### CONVERTING A LOW COMPRESSION ENGINE INTO A DIESEL.

THE great feature of the alteration to be described is the special hot-bulb chamber A, which is screwed into the tapped hole ordinarily occupied by the sparking plug. Into this chamber is screwed an insulated plug B, carrying a coil of chrome-manganese wire of very small diameter, which projects well into the centre of the chamber. In line with this projects an oil spraying nozzle, which plays on to a hollow tube C screwed into the

opposite side of the chamber B. This nozzle is closed by means of the needle-valve D, which is placed on the delivery side of the oil fuel pump, and is operated by the exhaust cam, the roller and push-rod being taken off at a suitable angle. The oil pump is driven either off the main engine-shaft or off a cam operated from the free side of the inlet valve cam. The only other alteration necessary is the attachment to the piston by means of countersunk bolts of a plate of mild steel for the purpose of increasing compression.

As everyone knows, the efficiency of an internal combustion engine increases with the ratio of compression, and we are able with this cycle to increase the efficiency without any risk of pre-ignition.

The cycle of operations during running is as follows:

**First Stroke.**—Down stroke of piston draws through the inlet valve (from which the carburettor connection has been removed) pure air.

**Second Stroke.**—On the up stroke, compression of this air begins, until a pressure of 110-115 lb. per sq. inch is reached at the end of the stroke.

**Third Stroke.**—At this point the needle-valve opens and oil is forced under pressure through the nozzle into the hot-bulb chamber on to the ignition tube, which retains sufficient heat to remain red hot from the previous

The application of Diesel principles to motor cycle engines is a subject around which much interest has recently centred, and though at the present time we see many difficulties in the way of development, such discussions as the following are of value, in that they stimulate interest.

It must be borne in mind that the principle of spontaneous combustion, as at present applied, falls short of efficiency, except in the case of a constant speed engine. Huge difficulties arise as regards regulating the fuel feed in those varying proportions necessary to obtain a wide range of speed, and frail, delicate mechanisms, subjected to high pressure, are not in keeping with that simplicity essential to a reliable motor cycle engine.

Quite apart from such complications, the problem of starting suggests difficulties. In the case of a single-cylinder engine it would be almost impossible to force the piston over compression, and it would probably prove necessary to turn the engine over several times ere combustion resulted. In the case of a two-cylinder vertical engine this difficulty would be partly removed owing to the fact that one cylinder, springing off compression, would assist the other on the upward stroke, but we are of opinion that in attempting to start a hot engine the cylinder would be sufficiently saturated with fuel to cause pre-ignition, in which case starting would be almost impossible.

At the same time, we realise that the difficulties which at present seem inseparable from the system are not necessarily inherent to it, and the suggestions of our readers are invited in the hope that they may foster development.

explosion. The oil immediately vaporises and explodes, forcing down the piston on the power stroke.

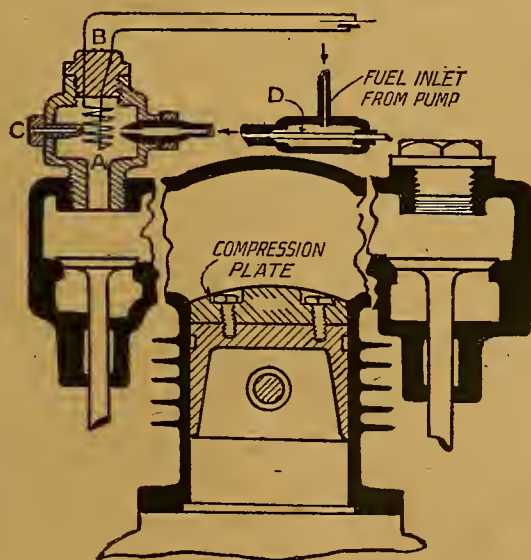
**Fourth Stroke.**—On the fourth stroke the products of combustion are swept out.

It will be noticed that on the compression stroke there is no fuel oil in the cylinder, and so there is no fuel leakage into the crank case. Therefore there is no danger of the oil in the crank case being thinned. Also for the same reason it is now apparent why

it was previously stated that there is no danger from pre-ignition, and so the high compression can have no dangerous results. The cycle is such that there is no need for warm air to be drawn into the cylinder, and so it is possible to draw in the maximum weight of air at every stroke, thus securing maximum output for a given size of cylinder. Not only is this the case, but the cool air has a beneficial effect on the cylinder walls. This latter is important, and its absence is partially responsible for the overheating of many petrol engines, when they are running on paraffin which has been pre-heated.

**Starting.**—The problem of starting such an engine is not as difficult as would appear at first sight. Electric current is put through the fine resistance wire coil B, either from an accumulator or by adapting the magneto suitably. This coil becomes very quickly heated to redness. The engine is then given a few turns, and the oil entering is ignited by means of this hot coil. As soon as the engine is firing regularly the current is cut off, and the ignition is then effected by means of the hot tube.

A few general remarks will show that the engine is not only satisfactory from a theoretical thermal point of view, but would have many advantages over the present petrol



Diagrammatic arrangement of engine.



## Discarding the Spark.—

engine. When running a much greater smoothness would be noticed, as, instead of the explosion being so violent, the effect of the injection of fuel is to increase the mean effective pressure throughout the power stroke at the expense of the explosion pressure, and so result in a more even thrust on the piston. This balances the effect of the extra compression employed, and so should remove the fears of the rider who has tried to increase his standard compression on a petrol engine with somewhat startling results.

The engine described in this article is a splendid example of simplicity of control, for only one adjusting lever is required, namely, that controlling the timing of the spraying nozzle. Of course, to anyone conversant with modern oil engine practice the cycle of operations is quite as familiar as the semi-Diesel cycle, and, whilst claiming nothing new in the way of discovery, the author would point out the ease with which it can be adopted to the modern motor cycle engine.

G.H.P.

## Aero Engines and Motor Cycle Engines.

### ARE WE ENTERING ON THE ALUMINIUM AGE?

**I** MUST confess at once that one very formidable problem creates a perceptible barrier between the aero and the motor cycle engines. The aero engine is intrinsically expensive, and its cost applies no less to labour than to material. Machined steel and aluminium are more costly than cast iron. The aero engine demands far more machining than any pre-war engine ever got, and where the motor cycle engine relies on cheap metals, the aero engine relies on costly metals. The machining aspects of this problem are partly alleviated by the fact that a motor cycle engine will probably rest content with one or two cylinders as against the six to twenty-two of the aero engine; but even at that the manufacturing process of an aero type motor cycle engine would show costing increases, even with improved shop methods. The other difficulty—cost of material—may defer the aero type of motor cycle engine for years. We have passed through the ages of Stone, Bronze, Iron, and Steel. There are many indications that we are entering on the Aluminium Age. Almost every branch of engineering depends upon an unlimited supply of cheap featherweight metal for its immediate progress, and no adequate supply of such metals can be foreseen. Still, it is a law of our existence that when a problem is visualised its solution is a foregone conclusion: and the time factor is invariably short where materialistic problems of chemistry and metallurgy are concerned. I have no doubt we shall get out gigantic supplies of strong featherweight metals somewhere, somehow, some day—to-morrow if not now—and I will therefore assume that within a reasonable period motor cycle designers will be able to apply aero engine principles to motor cycle engines. What will they give us? Here is a rough specification.

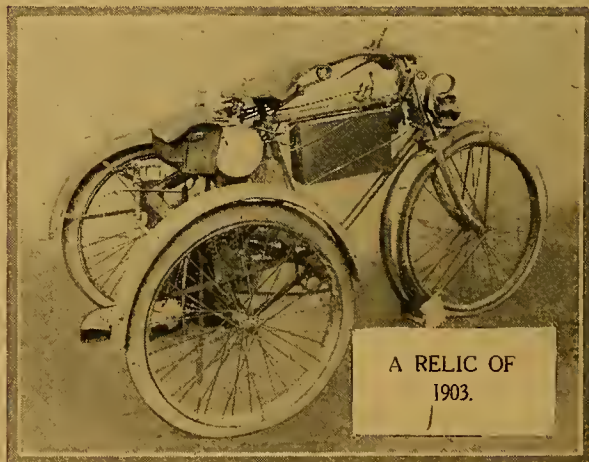
The engine may be, for example, a 200 c.c. flat twin, weighing, perhaps, two-thirds of the typical weight for a present-day 250 c.c. engine of similar type, and equalling in road performances the standard of our best modern vertical 4 h.p. single-cylinders, with the exception that it never overheats and climbs much more doggedly on its top gear. Its cylinder barrels consist of steel liners, round which are secured paper-thin copper or aluminium radiating fins. The detachable cylinder head is of cast aluminium alloy, with valve seats of a tougher metal incorporated in the casting. There are four overhead valves in each cylinder, the valves being formed of a steel of the tungsten group, which neither fractures nor pits. The

piston is of aluminium alloy, and its thin head is supported by a bracket resting on the gudgeon pin through a cut-away in the little end: this bracket further serves to keep the oil splash from getting burnt on to the piston. Thanks to improved cooling, carbonisation occurs very slowly, and no rider thinks of scraping out his engine or attending to his valves more than once a year: he naturally selects a winter evening for the job. The balance of the engine is perfect, and as the upper third of the revolution curve has been surrendered in the interests of dogged pulling on hills, the engine throttles down well when declutched.

The gear box is practically non-existent, being only required for exceptional hills, as the high power-to-weight ratio, coupled with the development of good power at low r.p.m., enables all normal climbing to be done on a single ratio.

The old range of types and models has practically simmered down to two. Some riders prefer a featherweight mount, which can be hoiked up steps, or walked into a lift to reach an upper storey flat. This handy pattern weighs about 120 lb. Others prefer luxurious touring, and models designed for their use weigh little less than the old 1917 simpler types, but score by including enormous mudshields, fully sprung frames, and complete lighting and starting outfits within this weight.

ROAD RIDER.



It is a far cry to races and trials of 1903, and this old and famous motor tricycle has an interest, inasmuch as it ran second in the race for the S. F. Edge Cup in 1903.





## WHICH TYPE OF CARBURETTER?

### SOME CRITICISMS OF PRESENT-DAY PRINCIPLES AND DESIGN.

**T**HOUGH it cannot be denied that great strides have been made in carburetter design and manufacture, and that the instrument of to-day is near perfection as regards the attention it requires, though carburetter makers as a whole have shown themselves more wide awake than the majority of accessory manufacturers, they have, nevertheless, exhibited a uniformity of conservatism in clinging to one generally accepted principle. During recent years it has been a matter merely of improvement and amendment so far as carburetter design is concerned, and an appalling lack of originality and inventive genius has been displayed. To introduce the fuel at the top of the float chamber instead of at the bottom, to employ three or four jets instead of one, or to utilise a cantilever system instead of toggle joints, is not novelty; it is merely variation of the old and accepted principle, which is not necessarily the best.

There are four recognised ways in which spirit can be rapidly vaporised:

- (1.) By spraying it in a strong current of air.
- (2.) By absorbing it in a porous material through which the air supply is drawn.
- (3.) By surface vaporisation, preferably assisted by heat..
- (4.) By some mechanical means.

#### How Wastage occurs.

Of these four No. 1 is the generally accepted method, but it possesses its obvious shortcomings. It is more likely to introduce a wet mixture to the engine than any other method. Under favourable conditions the spray or jet system leaves little to be desired, but the colder the atmosphere, the fuel, or the induction pipe, the wetter the mixture that reaches the engine. At all times the fuel leaves the carburetter and enters the induction pipe as a spray rather than as a gas, and if the induction pipe be at a temperature below the evaporation point of the spirit, then condensation is inevitable. This results in what can best be described as "staggering on the throttle," and is seen at its

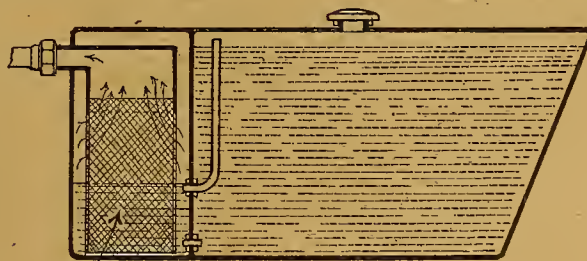
worst after driving the engine for some time at small throttle opening and suddenly banging the throttle fully open. What happens? A flood of liquid fuel is drawn from the induction pipe into the engine by the sudden rush of air, with the result that the engine falters badly—even ceases to fire for some seconds. This defect in present day carburetters is seen most clearly when a fairly heavy fuel is used, and fault No. 1 then can be set down to the fact that the present day carburetter serves only as an atomiser. It makes but one step towards converting the fuel into gas. It is merely an elaborate type of spraying machine, its function being to break up the fuel into such small particles that they can then be vaporised by means outside itself, *i.e.*, by heat generated by the engine.

#### A Wasteful System.

At this point one is reminded of the Canadian who, when asked by his boss in a civil kind of way what his name was, curtly replied, "It don't matter what in Jerusalem they call me so long as I do my work; that's all that concerns you."

The spray carburetter (including the jet) certainly does its work reasonably well, but this does not signify that nothing better can be invented. Another of its shortcomings is based on its delicacy. So much depends, for instance, on the petrol level, and particularly is this so with the one lever type. The slightest change in the density of the fuel—a thing of everyday occurrence in these days—entirely upsets its nicety of working.

Then again, the spraying of liquid fuel in a comparatively open vessel cannot be regarded as anything but a magnificently wasteful method. How many points are there in the structure of an ordinary carburetter at which wastage can and does occur? By switching over to a fuel which does not immediately vaporise on exposure to the air I have observed that a carburetter which I thought reasonably economical spurted large chunks of fuel from every corner and crevice, and when, by dint



An early wick carburetter designed by Lt.-Col. G. P. Mills, D.S.O., and used on early Raleigh motor cycles. The method of maintaining the level is interesting, the wick chamber becoming air-locked immediately the fuel rises above the ventilating pipe. The carburetter was very economical, but liable to give too rich a mixture over rough roads.



**Which Type of Carburetter!—**

of perseverance, these leaks were cured, the fuel consumption jumped from an average of 77 m.p.g. to an average of 101 m.p.g.!

**A Wet Mixture.**

It may be argued that the weaknesses already described are not peculiar to the jet carburetter, and belong to practically any other type, but as regards the vital point of condensation this certainly is not so. It is a recognised fact that when a light fuel is gasified it takes a good deal of restoring to liquid form, and the chief reason why so much condensation takes place with the spray type of carburetter is that the spirit is not *totally* gasified, but remains wet, with the result that it returns to its original state at the slightest provocation. It may be acknowledged that wastage by blowback can generally be laid with greater justice at the door of the engine manufacturer than at the door of the carburetter maker. Certainly valve timings will produce it in an incurable form; too slack an inlet valve spring will do likewise; but, at the same time, it must be acknowledged that some carburetters permit much more wastage by blowback than others.

The hot air intake undoubtedly assists vaporisation, but it does not prevent condensation, and, what is unquestionably preferable, is a jacket-heated induction pipe; in fact, I will go so far as to say that it is impossible for a spray carburetter to function completely under all conditions, unless it work in conjunction with a super-heater, which can most easily be arranged by utilising the exhaust gases.

Turning now to other types, the wick carburetter certainly offers unique advantages on paper. I have had no experience of it on the road for some years, but as regards its possibilities one need merely contemplate the fact that one engineering firm at least, whose reputation is world-wide, holds it as preferable for car engines. With the wick carburetter the spirit is truly vaporised ere it gets to the induction pipe, and there is no hurtling about of liquid fuel. The petrol level also requires no nicety of adjustment; excessive blowback cannot easily occur, for with this type

of carburetter strong suction is not required; in fact, it works better if the suction be fairly low, as air passing slowly through a large area of gauze gives more perfect carburation than if it is passing through a small area of gauze at high velocity. Therefore, the wick carburetter should give wonderfully easy starting; and, because there is no wastage by liquid fuel gaining the engine, the wick carburetter has proved itself more economical than the spray type. Then again, there are no jets to choke, and the float chamber could be of the very simplest and cheapest floating needle type.

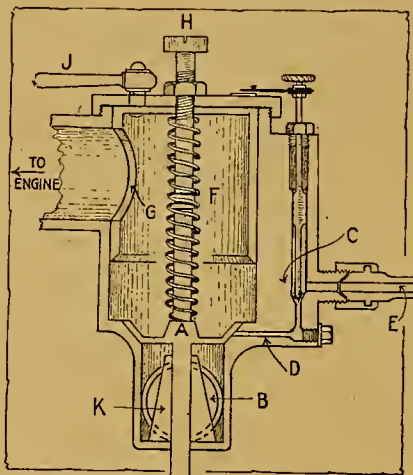
The wick carburetter, of course, has drawbacks—the choking up of the wick by impure fuel or by road dirt being one of them. But since the wick can be of ample area the air intake can be equally spacious, and the surrounding gauze, therefore, fine enough to exclude all foreign matter. Moreover, the wick can be so designed as to be easily renewable—a simpler and cleaner matter than cleaning a choked jet. Even on the score of cheapness alone the wick carburetter is worthy of more attention than it has received in the past. For easy starting and economy there is nothing to compare with it, and it is the very acme of simplicity as regards construction.

**A Suggested Intermediate.**

Though I believe the operation of a wick carburetter is perfect at low speeds, it is conceivable that it is not ideal for high speed work unless of considerable size. In my opinion, an ideal carburetter could be arrived at in the way of a combination between the spray and the wick, and such a design I have laid out roughly in diagrammatic form herewith. Up to half throttle the wick only feeds the engine, thereby answering the purpose of an

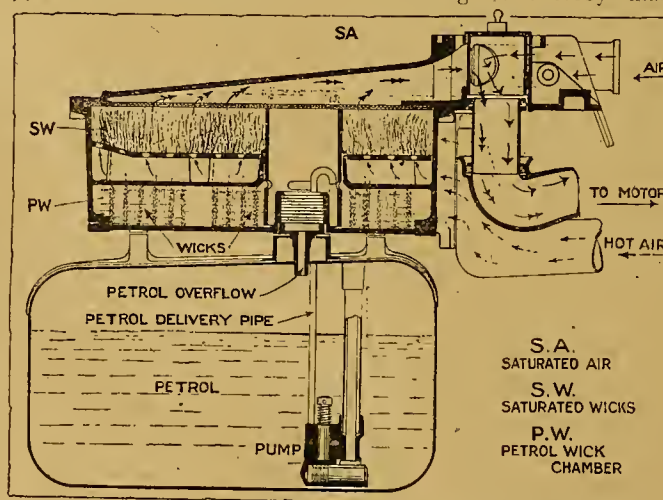
exaggerated pilot with perfectly graduated mixture of the charge. At half throttle a tapered needle is raised from the jet, which therefore comes into operation and admits an additional supply of spirit, similarly graduated, which is sprayed into the mixing chamber surrounded by the circular wick.

It will be noticed that immediately the jet comes into play auxiliary air ports are opened by the single piston, so that the supply would at all times be automatic. Most of one's running would be done on the wick, therefore one would



A design of floatless carburetter used on machines in 1903. A vacuum is created by the suction stroke of the engine, which thus lifts the valve in the centre of carburetter. At this moment the petrol is vaporised by being sprayed through a very small hole in the valve seat, the fuel being mixed with air heated by the exhaust pipe and drawn through the induction pipe into the engine.

- |                       |                       |
|-----------------------|-----------------------|
| A. Valve and mixer    | F. Mixing chamber     |
| B. Air inlet          | G. Throttle           |
| C. Needle valve       | H. Adjuster and screw |
| D. Sprayer            | J. Throttle lever     |
| E. Petrol supply pipe | K. Valve guide        |



The Lanchester wick carburetter. Petrol is pumped from the tank to the carburetter, the overflow returning to the tank. The single-headed arrows indicate the course of the hot air, and the double-headed arrows indicate the course of the carburetted fuel on its way to the engine.



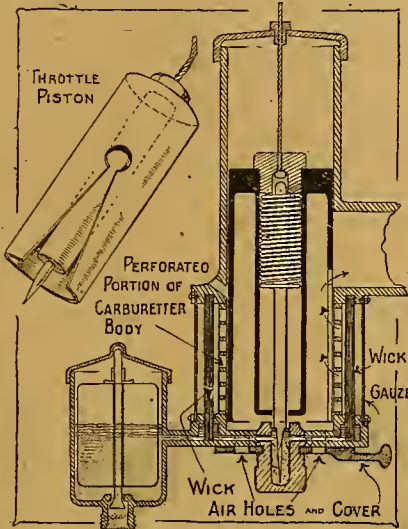
**Which Type of Carburettor?—**

obtain the economy and easy starting of the wick carburettor whilst still enjoying the lively effects of the spray at high speeds. Also, it should be noticed that the jet would come into operation only when there was considerable suction on the carburettor, and half the defects which jeopardise the perfect working of the present-day carburettor would be overcome. No niceties of petrol level would be required, and no blowback through inadequate suction on the carburettor would occur.

**Knocking up the M.P.G.**

We have undoubtedly a long way to go ere we arrive at bedrock simplicity and satisfaction in carburettor design. Space does not permit of my entering fully into all the interesting themes that naturally present themselves. Even the mechanically operated carburettor vaporising the fuel under pressure and feeding a forced supply to the engine for all varying demands is not so tough a proposition as it sounds, and may come in time, at any rate for racing engines, as it offers a means of piling up volumetric efficiency.

The waste heat from a petrol engine is enormous, and it is surprising that no real effort has been made better to utilise some of this heat—if not to assist carburation, then to prevent condensation. If the charge were drawn round the valve pockets through a passage containing a series of internal fins, its cooling effect would be greater than that of the open air, while the fins would split up and “fix” the gas, thereby preventing faltering and lowering consumption. It is a fact that the man who has time and knows what he is about can generally knock up his miles per gallon to the tune of from ten to thirty, and this simply by making good certain omissions from the standard type of carburettor, and without touching the engine at all.



A suggested design of combination carburettor. The wick only is in use up to half throttle, when the graduated needle is raised from the jet in unison with the uncovering of extra air holes. Note that the full area of the wick is always on draught, while the “fixed” air supply is adjustable for obtaining an ultra rich mixture for starting.

**A Plea for Simplicity.**

One need not point out the stupendous market which awaits the carburettor of bedrock simplicity—the instrument that can be made at a few shillings. This is not a mechanical impossibility, and must come in time. It is probable that the perfect working of the instrument will lie in its very simplicity. Recently, however, carburettor design, instead of becoming more simple, has shown a tendency towards becoming more

and more complicated, presenting more working and wearing parts, and, if anything, becoming more tricky in operation, and more susceptible to disarrangement. Car carburettors can afford to be complicated because car men like to pay for them, and it has always seemed to me that complications came in the disguise of simplicity when following car practice. We were hurled into a chaos of multiple jets and suchlike, while the manufacturer smiled blandly and exclaimed, “There! look what I have done for you. I have given you only one lever to twiddle! How is that for simplicity?” One is tempted to reply, “Drop it! It’s not yours, so pull it out.” We do not want miniature car carburettors for motor cycles. For one thing, they are too costly; for another, true efficiency does not permit their being cramped into the space at one’s disposal, unless the working parts—subjected even to greater strain and more exposed than a car—be robbed of working and wearing surface.

The motor cycle warrants a carburettor of its own, and the sooner somebody departs from conventional lines and gets down to it in real earnest the better. Let us show some originality and inventive genius uninfluenced by motor car practice. Let us dispense with the necessity for accurate petrol levels, minute orifices, and suchlike, for simplicity and cheapness are the keystones of success. CHINOOK.

## Further Notes on the Latest Petrol Order.

THE Board of Trade makes the following announcement regarding the endorsement on the Demand Note Forms recently circulated by the Petrol Control Department for the latest renewal of motor spirit licences (for motor cycles):

“The issue of a licence will be subject to the condition that the licensee shall hold himself, or his paid driver, and his motor car or cars at the disposal of the Military Authorities for use in the event of a national emergency.”

“The particular ‘emergency’ contemplated by this endorsement is that which would be caused by the invasion, or apprehended invasion, of our shores by an enemy force. In such an event the immediate supply of motor vehicles in districts affected would be of great military value.”

The War Office propose to direct the County Commandants of counties to ascertain the number of motor vehicles thus available in a county through the Motor Volunteer Corps Organisation. The object to be aimed at is the enrolment of sufficient motor vehicles to meet all “military” needs caused by such a contingency as the above.

To accomplish this, the County Commandants will in due course approach owners of motor vehicles who hold motor spirit licences with a view to obtaining and recording such few particulars, as to type and suitability of vehicles, etc., as may be necessary.

This or any other endorsement does not in any way affect or limit the powers conferred on the Military Authorities by Section 115 of the Army Act with regard to the impressment of vehicles.

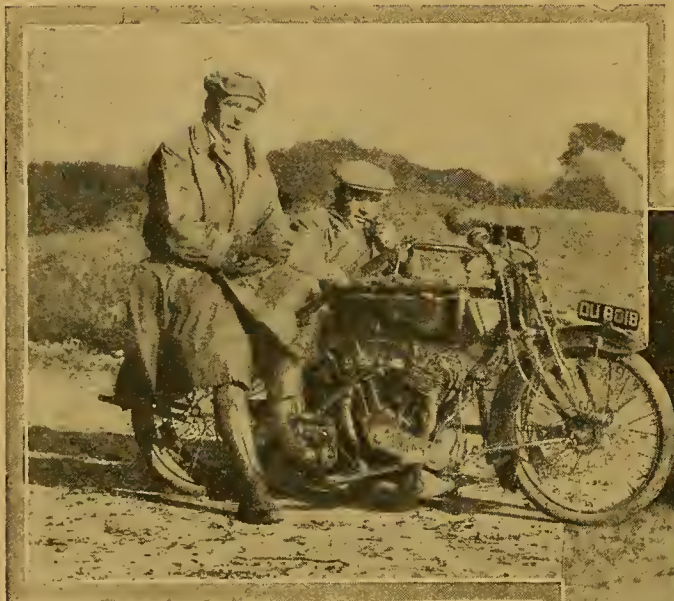


## A SPORTING CHALLENGE.

4 h.p. Single-cylinder Sidecar *versus* 8 h.p. Twin Outfit in Speed and Climbing Test.

**A**S was intimated in these pages some little time ago, the makers of a famous 4 h.p. single-cylinder machine expressed their readiness to "take on" any standard 6 or 8 h.p. twin over a good main road course terminating in a severe test hill of almost a mile in length—both machines to be fitted with sidecars. The challenge, which had been hanging fire some little time, was accepted by a member of our editorial staff, who upheld that it was next door to impossible for any machine of 550 c.c. to hold its

his sidecar, though certainly on the light-side, was a standard Montgomery touring car, and that he had certainly not the faintest intention of attempting high speeds with a windscreen fitted. The Triumph riders considered that rather an unsporting advantage had been taken by this diversion from the previous agreement, which they themselves had most carefully observed, and on weighing the two sidecars it was found that the Montgomery fitted to the twin scaled only 112 lb., while the Gloria fitted to the Triumph tipped the beam at 182 lb. These figures enable the reader to form his own conclusions, and it remains only to be said that in both engines standard practice was adhered to throughout, no freak tuning or stunt timing being allowed, while standard gear boxes were used. The Excelsior was fitted with a Senspray carburetter for the occasion, and was in magnificent tune.



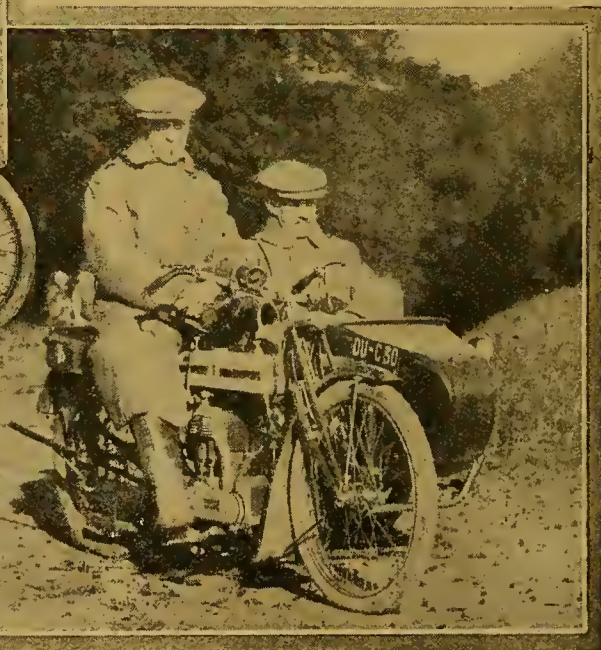
(Top) Geo. Brough and the 8 h.p. J.A.P.-engined Excelsior after the event. (Right) Mr. "Jones" aboard the 4 h.p. chain-driven Triumph.

own against a well-tuned 970 c.c. engine in the hands of a skilled driver.

Recently the event came off, and since it seems to be common knowledge as to who issued the challenge, there is no purpose in longer concealing the names of the two competing machines. The 4 h.p. Triumph was ridden by Mr. "Jones," with Mr. F. Hulbert as passenger. It was their post-war model, with all chain drive, incorporating the new Triumph shock absorber—a mechanism of remarkable efficiency. The driver selected for the 8 h.p. twin was Mr. George Brough, who rode a standard J.A.P.-engined British Excelsior, which he had carefully tuned for the event.

### A Slight Discussion.

Some dissatisfaction was caused when the competitors met on its being observed that the Excelsior was equipped with a very light sidecar, it having been understood that a heavy touring attachment, complete with windscreen, and in general keeping with the machine, was to be used, but Brough contended that



### Over the Course.

A fast run of ten miles saw the last of the villages, and 14½ miles of clear going to the top of the test hill lay ahead. It was agreed to slacken up for such small hamlets as were to be passed through, keeping the distance between the machines as equal as possible, but owing to some misunderstanding as to the starting point some 200 yards separated the machines when the throttles were finally opened—the twin leading.

After that the pace was distinctly hot—at certain points attaining speedometer readings almost beyond belief. Slowly but steadily the distance between the two machines was increased, the big twin, with the roar of an aero engine, covering the long straight stretches at bewildering speed. The lighter machine



## A Sporting Challenge —

held on magnificently, but after the first mile there was no question as to the final issue. Brough's cornering was hair-raising especially for his passenger, and he used his head well, while the Triumph riders, taking no risks, likewise lost no chances. Soon, however, the trusty single was lost to sight, and it was then a matter as to how many minutes would separate the two at the top of the test hill.

Both machines practically covered the route with throttles wide open, and "Jones" was rather building on his chances of tiring the twin and making up time during the ascent of the long test hill, his engine being a marvellous sticker. The twin, however, showed no tendency in the direction of falling off in power, the malicious bark of its exhaust remaining unchanged.

Gaining the test hill Brough changed into his middle gear at the first bend, and roared to the summit 2m. 30s. ahead of the Triumph. "Jones" did not change down till he reached the second corner, and he also made a magnificent ascent.

The difference in the speed of the two machines over the entire route was approximately 6 m.p.h. in favour of the big twin. The performance of the single was, however, most praiseworthy. Everyone will admit that for a machine of this type, having a  $5\frac{1}{4}$  to 1 top gear ratio and fitted with a heavy sidecar, to hold so high an *average* speed, including slackening down for villages and the long test hill, is nothing short of marvellous. We ourselves have handled the identical post-war model on more occasions than one, and we can assure our readers that for balance, speed, and all-round controllability, the new chain-driven Triumph is an eye-opener. Similarly, Brough is to be complimented not only on his wonderful driving, but upon his skill as a tuner, since he had no works outfit at his disposal. We were sorry that Brough fitted so light a sidecar, as this state of affairs robbed the event of some of its interest, but at the same time the argument that it was a standard attachment holds good, and reflects credit on the makers of the sidecar for the very desirable reduction of weight in their standard model.

## FLAT *versus* V TWIN.

### CHIEFLY CONCERNING THE MATTER OF BALANCE.

FOR some months past I have been riding a 500 c.c. flat twin, but quite recently returned to a big V—a machine which may be taken as representing the best of its type, and which, prior to my experience with the horizontally opposed, I should have regarded as very near perfection in the matter of sweet running. But my experiences with the perfectly balanced engine have entirely spoilt all appetite for anything in the way of compromises in the V twin class, and my present mount of that description strikes one as greatly lacking in refinement when it comes to speeds exceeding 30 m.p.h.

The great difference between the two is that while the flat twin ran as sweetly and as smoothly at 50 m.p.h. as at 20 m.p.h., and had no perceptible period at any speed, the V twin begins to tell one about it immediately one exceeds 30 m.p.h. From that speed upwards the racket and the vibration steadily increase, and one becomes conscious of a certain harshness which was entirely unknown to the horizontally opposed.

Up to 30 m.p.h., however, there is very little difference between the two. The big V ticks over very

comfortably and smoothly, and is generally more manageable at low speeds than the flat twin, for with the latter it was necessary to keep up the revs. to avoid a "pink," making liberal use of the clutch and gear box. This, however, was nothing to do with the disposition of the cylinders, and would apply equally to a V fitted with overhead valves and semi-racing cams as to a flat twin.

No reasonable individual would deny that many excellent V twins exist, but since the type possesses inherent faults which do not exist in the case of the flat twin, and since, further, all the inherent good points of the popular type of V can be obtained to an equal extent on the horizontally opposed. In my

opinion, the only V twin worth riding is the one fitted with a Gradua gear, giving an infinity of gear ratios, by means of which one is able always to hold the engine down to its work and dodge its period. By fitting a sidecar one accomplishes much the same end, the engine being at all times on heavy load, which prevents its reciprocating parts from flying into competition with one another.

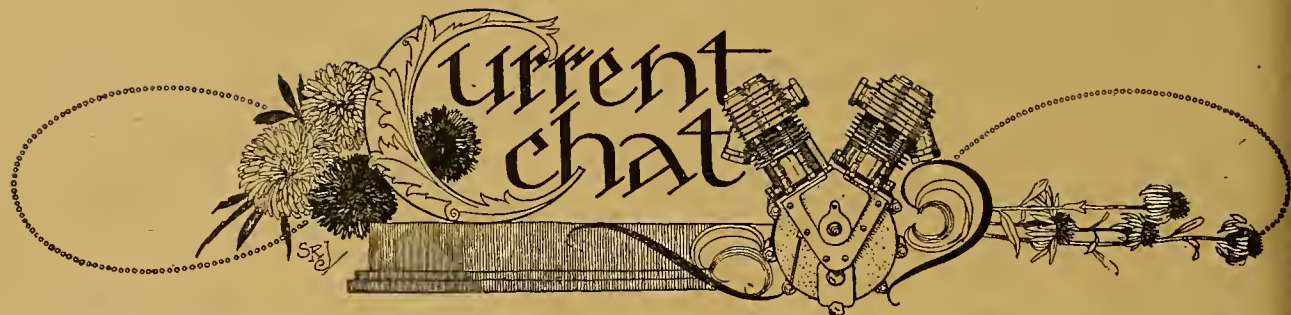
### TEST OF RUSSIAN MILITARY MODELS. (See page 431.)



The course lay through muddy lanes in which the mud was a foot deep.

CHINOOK.





### TIMES TO LIGHT LAMPS.

#### GREENWICH TIME.

Nov. 1st	...	...	5.3 p.m.
" 3rd	...	...	4.59 "
" 5th	...	...	4.55 "
" 7th	...	...	4.53 "

### Coal Gas.

We hear of several new tests that are taking place in connection with coal gas, and hope to give particulars of a new type of gas envelope at an early date.

### A New Name.

Joy-riders in future will probably be known as balloonists.

### A Special Column.

A correspondent suggests that, in addition to our weekly page devoted to aeronautics, we now run as a standard feature a paragraph entitled "Balloonage."

### The Long Bow.

We fear that a tendency exists among those interested in pressure gas cylinders rather to overstate their possible contents—slightly, perhaps, but nevertheless quite perceptibly. Readers who hear that a new gasbag, equivalent in size to a well-developed walnut, and capable of running a motor cycle fifty miles or so, has been invented, will be well advised to enquire into the matter before taking it as gospel truth.

### Cycle and Motor Trades Benevolent Fund.

We are in receipt of the 1917 booklet published by the Cycle and Motor Trades Benevolent Fund, which contains the rules, list of members, and other information concerning this useful institution. Together with the book has been sent a letter from Mr. Ernest Brown, President of the Benevolent Fund, appealing for assistance to enable it to continue its beneficent work among members of the trade who have fallen on bad times. At this time of the year it has been customary to hold a dinner, when members of the trade had the pleasure of meeting one another and of contributing to the funds, but owing to present circumstances it has not been considered expedient to hold the dinner this year. The president therefore appeals to the munificence of both old friends and new to send in their subscriptions. During the last three years the Fund has distributed over £3,000 a year to those in want, and many grateful letters have been received from those who have received help. Subscriptions should be sent to the general honorary secretary, Mr. A. J. Wilson, 154, Clerkenwell Road, London, E.C.1.

### Union Secretary's Appointment.

We are informed by the A.C.U. that Major J. W. Loughborough, O.C. 12th Batt. Surrey Volunteer Regiment, and Secretary to the Union, has been appointed by the Army Council a Military Member of the Surrey Territorial Force Association.

### The Arbuthnot Trophy.

The statuette to the memory of Sir R. K. Arbuthnot, Bart., has now been finished by the decoration of the plinth. On the front is the inscription to "A Great Motor Cyclist," and on one side is the badge of H.M.S. *Defence*, while on the other side is the A.C.U. badge.



"FATHER" OF THE TANKS.

Col. Swinton, the original "Eye Witness" to the British Army in France, who is now on a commission to America with Lord Reading and others.

### SPECIAL FEATURES.

#### TEST OF RUSSIAN MODELS.

#### WHICH TYPE OF CARBURETTOR?

#### DISCARDING THE SPARK.

#### A SPORTING TEST.

### Motor Cyclist becomes Aviator.

Alan T. Beddell, the well-known American racing motor cyclist and holder of the trans-continental record across the American continent, which he carried off this summer on a Henderson, has joined the aviation school at Ithaca, New York, previous to joining the American Flying Corps.

### The Petroleum Executive.

In the recent Petroleum Executive Sir Boverton Redwood has been appointed Director of Technical Investigation. Sir Boverton Redwood, as most of our readers are aware, is one of our most brilliant scientists, and is a very old and prominent member of the R.A.C.

### Treatment One Appreciates.

The British concessionaires of American machines are usually upheld for the good treatment they extend towards their customers, and there is no doubt that one or two British firms—not all, by any means—might advantageously take a leaf from the same book. A correspondent informs us that, on expressing veiled dissatisfaction to the concessionaires with the manner in which certain parts of his 5 h.p. American machine had worn, he was promptly supplied gratis with new parts. The machine was two years old, and this is the kind of treatment which sticks in a motor cyclist's memory.

### The Motor Spirit Restriction Order.

We can quite well see that there will be a number of legal cases in the near future dealing with contraventions of this new Order. In the last issue we dealt with the question of petrol granted to soldiers on leave for their own private purposes—a point which should certainly be taken into consideration by the authorities. Next comes the question of the use of petrol for the demonstration of motor bicycles for sale, for the delivery of machines to the purchaser, or to a second-hand dealer. It is not pointed out in the Order that the use of motor spirit for the purposes above mentioned is legal.

The onus of proving that petrol is being legitimately used lies with the rider of the machine, and as each bench of magistrates is likely to interpret the Order in a different manner it is likely that there will be cases of hardship.



Commercial Motor Volunteers.

The City of London Motor Volunteer Corps (1, 2, and 3 Squadrons) have been given authority to enrol commercial motor vehicles for the use of the military authorities in any national emergency. No call would be made on the owners of such vehicles except in the case of a national emergency, and free petrol would be supplied for the work.

Honour for Pioneer Designer.

We learn that Col. H. C. L. Holden, C.B., has been made an Hon. Brigadier-General. He was formerly chairman of the Royal Automobile Club, and is a vice-president of the Auto Cycle Union, with which he has been connected since its inception. It is, of course, well known that General Holden was one of the pioneers in motor cycle design, having constructed an ingenious four-cylinder motor cycle in 1902.

Function of the Use of Coal Gas.

Responding to an enquiry made by the A.A., the Minister of Munitions said that, "so long as the gas is conveyed in pipes at, or slightly over, atmospheric pressure, and not compressed in steel cylinders, it is not considered that there is at the present time any need on general grounds for restricting the use of coal gas for motor purposes." At the same time it was pointed out that, if the use of coal gas became general, it might then prove necessary, in the interest of the nation's requirements, to impose certain restrictions. From the wording of the letter sent us by the A.A., we judge that restrictions are likely to be imposed upon high-pressure cylinders made of steel, but not necessarily upon pressure cylinders made of more or less flexible materials, containing, say, a light steel shell, or strengthened by means of steel wire. This type of pressure cylinder, as we have already pointed out, is more likely to prove satisfactory than the steel cylinder, which presents certain insurmountable difficulties.



A batch of Ariel motor cycles, taken over by the Indian Government from the agents for Ariel machines in India, for use with the Mesopotamia Forces. They are shown stacked on a barge on the Tigris.

The National War Funds.

At the week-end the principal war relief funds stood as follow:

The National Relief Fund (distributed £3,705,822) .. ..	£6,277,227	0	0
British Red Cross Fund .. ..	7,348,009	0	0
King George's Sailors' Fund .. ..	60,641	0	0
Tobacco Fund .. ..	139,100	0	0

A Douglas War Sale.

A batch of twelve Douglas solos, ranging from an early model, priced £13 10s., to a late W.D. (not ticketed), are displayed for sale at a depot at Lee, S.E. Some of the machines have evidently seen hard and recent usage, but look serviceable and in good order. A notice hanging near reads, "Offers or exchanges entertained."

Training for the Tanks.

A motor cycle marine engineer—and well-known competition rider—now in the Tank Corps, home on leave last week, stated to a correspondent that he attributes his immunity from *mal de mer* (common amongst Tank recruits at the beginning of their training) to his pre-war experiences in the engine room of a "tramp"!

The Transport of Soldiers.

The Earl of Cottenham has requested us to appeal for volunteers to swell the ranks of the Motor Transport Volunteers, founded by Sir John Lister-Kaye and Commandant C. R. Freemantle in February, 1916. The work of this corps is, we think, too well known to need any detailed description on our part, but we may remind our readers that it consists in conveying soldiers from one side of London to the other when they are travelling on leave. Petrol is provided by the military authorities, and there are at present in use 159 motor lorries, 186 private cars, and 27 motor cycles with sidecars.

Any owner of a motor vehicle capable of carrying passengers is earnestly requested to communicate with the Acting Adjutant, the Earl of Cottenham, 31, Walbrook, E.C.4.

Gasbags of Cape Cart Hood Material.

Now that the use of coal gas is likely to become popular on motor cycles it is always interesting to hear of a fresh firm which makes a speciality of containers for employing the now only available fuel. Messrs. W. D. Talbert and Co., 46 and 48, Sun Street, Finsbury Square, London, E.C.2, inform us that they are now paying particular attention to the manufacture of gasbags for motor cycle sidecar combinations.

The cloth of which the bag is made is Cape cart hood material, which is of double thickness and is treated with rubber, so that it should be quite gas-tight. The joints are in the form of a double welt, and look particularly strong. A  $\frac{3}{4}$ in. internal diameter union is supplied for filling the bag, and a  $\frac{1}{4}$ in. outlet is also fitted for the exit to the engine.

These containers are made to order, according to customers' requirements. A gasbag to contain about fifty cubic feet of gas costs about 45s.

Average Prices.

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3½ 2-speed .....	—	£42
Abingdon ..	1914	5-6 3-sp. sidecar ..	£60	£54
A.J.S. ....	1916	6 combination ..	£98	£96
" .....	1914	6 combination ..	£78	£68
" .....	1916	4 combination ..	—	£75
Allon .....	1916	2½ 2-speed .....	—	£31
" .....	1914	2½ 2-speed .....	—	£27
Ariel .....	1915	3½ 3-speed .....	£61	£73
" .....	1914	5-6 combination ..	£55	£53
Bat .....	1914	6 3-speed .....	—	£46
Bradbury ..	1914	4 2-sp. sidecar ..	£39	£40
Brough .....	1916	3½ 2-speed .....	£60	£53
B.S.A. ....	1916	4½ sidecar .....	£54	£62
" .....	1915	4½ sidecar .....	£63	£55
Calthorpe ..	1916	2½ 2-speed .....	—	£30
" .....	1915	2½ 2-speed .....	£22	£25
" .....	1916	2½ 2-stroke .....	—	£28
Clyno .....	1915	2½ 2-stroke .....	—	£25
" .....	1914	6 combination ..	£57	£63
Connaught ..	1915	2½ 2-stroke .....	£18	£24
Douglas .....	1916	2½ 2-speed .....	£48	£47
" .....	1915	2½ 2-speed .....	£44	£44
" .....	1914	2½ 2-speed .....	£34	£38
Enfield .....	1916	6 combination ..	£94	£84
" .....	1915	6 combination ..	£77	£74
" .....	1916	3 2-speed .....	£47	£43
Excelsior ..	1915	8 2-speed .....	—	£40
H.-Davidson ..	1916	7 combination ..	£88	£83
" .....	1915	7 combination ..	£68	£71
Henderson ..	1916	7 combination ..	—	£100
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	5 combination ..	£55	£62
" .....	1916	7-9 combination ..	£81	£77
James .....	1916	4½ combination ..	—	£65
" .....	1916	2-speed 2-stroke ..	—	£53
Lea-Francis ..	1916	3½ 3-sp. sidecar ..	—	£63
" .....	1915	3½ 3-sp. sidecar ..	—	£58
Levis .....	1916	2½ Popular .....	£25	£24
" .....	1915	2½ Popular .....	£20	£22
Matchless ..	1915	7 combination ..	—	£81
New Hudson ..	1916	2-speed 2-stroke ..	—	£28
" .....	1916	4 combination ..	—	£60
New Imperial ..	1916	2½ 2-speed .....	—	£35
" .....	1915	2½ 2-speed .....	—	£28
Norton .....	1916	3½ 2-speed .....	£53	£53
" .....	1915	3½ T.T. ....	—	£43
P. & M. ....	1915	3½ combination ..	—	£69
" .....	1914	3½ combination ..	—	£51
Premier .....	1915	2½ 3-speed .....	—	£47
Royal Ruby ..	1915	2½ 2-stroke .....	—	£22
Rudge .....	1916	3½ Multi .....	—	£44
" .....	1915	3½ Multi .....	£42	£42
Scott .....	1916	3½ combination ..	—	£65
Sun .....	1915	2½ 2-speed .....	£25	£22
Sunbeam .....	1916	8 combination ..	£115	£110
" .....	1916	3½ solo .....	—	£75
" .....	1915	3½ combination ..	—	£76
Triumph .....	1916	2-speed 2-stroke ..	—	£37
" .....	1915	4 countershaft ..	£60	£58
" .....	1915	2-speed 2-stroke ..	—	£28
Velocette ..	1915	2½ 2-sp. 2-stroke ..	—	£26
Zenith .....	1915	8 Gradua .....	£49	£60



## Specialising in Motor Cycle Engineering.

**A Co-operative Scheme between the Trade and the University of Birmingham for the Technical Training of Incipient Motor Cycle Designers and Manufacturers.**

**A**N item which is of general interest to motor cyclists, particularly those of youthful age, who intend to adopt motor cycle engineering as a profession is the decision arrived at by the Cycle and Motor Cycle Manufacturers and Traders' Union to donate, from the funds of the Union, a yearly sum to the Birmingham University to encourage students to specialise in subjects connected with this industry.

As far back as last February the Management Committee of the Union was considering such a suggestion, and asked the president (Mr. C. A. Hyde, of the B.S.A. Co.) to interview the principal of Birmingham University (Sir Oliver Lodge) and ascertain his views on the proposal. Sir Oliver welcomed the suggestion, and, arising out of the above-mentioned interview, proposals, which we will enumerate later, were agreed upon by the Management Committee of the Union at its meeting last week. It will thus be seen that even in the case of a generous offer to encourage students who have gained their B.Sc. degree, to specialise in the particular industry in which the Union is concerned, requires a considerable amount of organisation, discussion, and arrangement before it becomes an accomplished fact, accepted by the University and the Management Committee of the Union.

### Government Funds for Industrial Research.

Mr. Alfred Bednell, general manager of the Union, informed us, when we called upon him last week, that, subsequent to the above-mentioned interview between Mr. Hyde and Sir Oliver Lodge, it was ascertained that the Government had placed a fund of a million pounds at the disposal of a department to encourage industries to undertake research work. The Union therefore got into touch with the head of this department, Sir Frank Heath, who, while strongly advocating that too ambitious a scheme should not be adopted at the commencement, thought that the present one was perhaps too small for practical results. He advised, among other things, that the direction of investigations at the University should be in the hands of a board appointed by the industry, who would decide whether results obtained should be published for the benefit of the industry, and, if so, in what form. He also pointed out that similar schemes were already in practice in respect of other branches of industry, notably in Glasgow.

It is with pleasure that we announce that the committee has agreed to and the general body of members has approved the following proposals, which are the result of the meeting between the president (Mr. C. A. Hyde) and Sir Oliver Lodge:

### The University-Trade Agreement.

"That the money handed over by the Cycle and Motor Cycle Manufacturers' and Traders' Union, Ltd., should be treated by the University as a temporary trust fund to be administered as follows:

"(a) For the provision of certain equipment and appliances necessary for a specific research in motor cycle and cycle construction, having special

reference to details of framework, as well as to the improvement of engines.

"(b) The annual payment or maintenance of a competent graduate student investigator.

"(c) The covering and incidental expenses for the consumption of material inevitable in laboratory work.

"The results of the research to be communicated from time to time (say twice a year) to the Cycle and Motor Cycle Manufacturers' and Traders' Union, and ultimately the whole to be published as general information by the workers, possibly as a University Thesis, it being manifest that the cycle and motor cycle manufacturers would be in a position to make the first and best use of any available information therein published, the work being done under the supervision of the engineering professors of the University, and with the assistance of the University staff of workmen."

The whole of the above provisional proposals were agreed to at the meeting of the Management Committee held last week, the arrangement to be in force for a period of five years.

We congratulate the Union on its enterprise in donating a portion of the Union Funds to such a worthy purpose as the encouragement of specialists in engineering as applied to motor cycles, more particularly because the machines may be of the greatest benefit to the State. Also there is the consideration that the very youths who will be encouraged to devote a year or two more of study to a special branch of engineering such as motor cycle manufacture will be in many instances enthusiastic users of the machines they will be endeavouring to improve.

### The Question of a Trade Ambassador.

At the time of our visit to Mr. Bednell we also discussed the suggestions that had been before the Union, which were announced in our columns early this year, where a group of the members had urged the idea of sending an ambassador of the trade to foreign and Colonial markets. The original suggestion, after many meetings, gave place to one of sending a selling representative in the interests of a group of manufacturers of relatively small proportion. A large number of the members, however, were still in favour of the original scheme to send a trade ambassador in the general interests of the industry, and that it should be done at once with a view to preparing for trade after the war.

The committee that had the matter in hand drew up a definite scheme, wherein it was suggested that the following countries should be visited: Australia, New Zealand, South Africa, India, and British and Dutch East India.

After due consideration and the taking of one or two plebiscites, it became evident that feeling on the matter in trade circles was by no means unanimous, and that there were more opponents than supporters for the scheme, which therefore has had to be abandoned.



# SEVERE TEST OF MILITARY MACHINES.

Russian Inspectors take Sidecar Outfits over a Freak Route.

AS is well known, the roads in Russia, especially those in the war area, are probably the worst and most trying that motor cycles have to traverse. Therefore it is natural that English motor cycles which are being made for the Russian Army should have to undergo severe tests. With the object of testing the New Imperial 8 h.p. machine, an official test of a most arduous nature took place recently. Six New Imperial 8 h.p. machines with sidecar and passengers, two ridden by Russian officer inspectors, two by English officer inspectors, and two by riders from the works, under-

there was no way through, all got stuck, and had to be pulled out by main force.

## Amusing "Mud Throwing."

After a twenty minutes' run a course was taken through the woods on a by-path. On this portion of the route one of the drivers had to give up, the driving being transferred to his passenger. For the next hour the road consisted principally of a mixture of marsh lands, deep ruts, gulleys flooded with water, the drivers and passengers being thrown first in one direction and then in the other.

of driving through country of this description, a drive at high speeds for about twenty miles brought the trial to an end at the Burford Bridge Hotel. Several Midlanders accompanying the expedition were surprised at the beautiful stretches of country visible from the high points.

During the whole run not a single machine had to be touched and no adjustments were necessary, the whole trial being an absolute triumph for the war machines. All the machines lined up in the garage within half a minute of each other, and were in good condition



The group of Russian and English officer inspectors before the start of the trial.



Starting of the official test of the Russian military model Imperials.

went what proved to be an extremely strenuous trial. The six machines were taken out of stock from random. The meeting place was at Esher in Surrey, and the course was chosen by the Russian authorities, and is known as the "Caterpillar Track." The machines were first of all lined up at the starting place, and tested for easy starting and engine speed. The various inspectors then chose their machines, and a start was made at 10.30 in the morning. Although there had been much rain during the previous week, the morning promised well, and the sun was shining brilliantly.

## The Course.

The course was from Esher over Bookham Common, *via* Sandy Lane, merely a bypath through the woods. The first obstacles encountered were a series of mud pools, which were sunk into the road, and contained from a foot to two feet of thick slime, through which the machines had to churn their way. Driving was enlivened by the fact that the road was hardly wide enough to take the outfits, and the ruts made by previous vehicles were 12in. to 18in. deep, and filled with water and mud, while here and there were sundry branches of trees and loose shingle. The first two outfits came through without trouble, but the third became embedded in the mud with the engine "revving" at high speed, the back wheel spinning merrily in the quagmire. Closely following on this machine were three others, and as

Several collisions with the hedge occurred, and in this connection an amusing incident took place. One of the drivers, who had evidently been taking the hedge from the muddy side of the track—judging from the mud caked over his person and dress—remarked to his passenger, "I have had it this time, but I promise you shall have it coming back." Later on it was very evident, from the distinct signs of contact with bramble bushes on face and clothes of the passenger, that this "promise" had been faithfully kept.

After about two hours' run, Mr. Downs, who was driving one of the works machines with a Russian officer in the sidecar, took what appeared to be an inoffensive tuft of earth covered with grass, but which proved to overhang a deep mud pool, into the centre of which the machine landed. The assistance of half a dozen riders was required to haul the machine and passengers out of their "dug-outs."

## The Finish.

Occurrences of this sort were frequent. The vile surface of the routes taken was beyond description. So far as one could gather, the track led across Bookham Common, taking a line through Leatherhead, over the North Downs, and through the moorlands and forests of Mid-Surrey. Several stiff gradients with appalling surfaces were taken, and this after the gruelling the machines had already undergone, in the majority of cases on second gear. After three hours

—except for the mud which filled the wheels and even oozed up between the silencers and the gear boxes.

## Constructional Details.

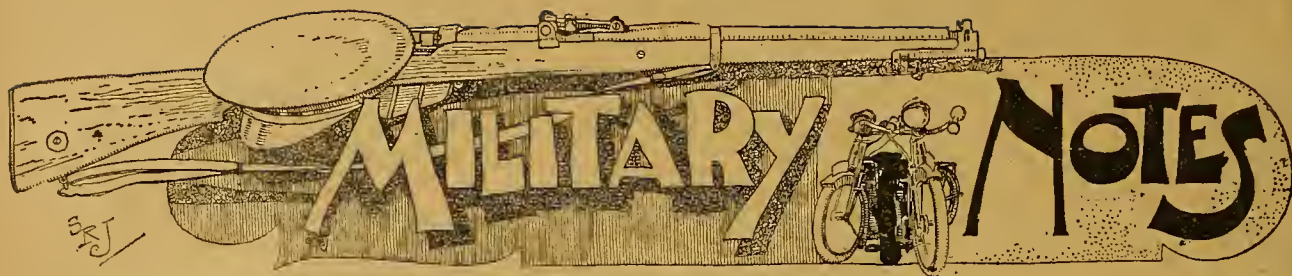
The New Imperial is provided with a 6in. ground clearance at every point, and is designed throughout for Overseas use. It is safe to say that few pre-war machines would have stood up to such a gruelling without shedding their lower trappings. The trial occupied three and a half hours, and all who witnessed it were warm in their praise of the performance of the mounts. It was certainly one of the most trying all-round tests of motor cycles that has ever taken place in this country.

## Specification.

The specification of the New Imperial war model is briefly as follows: 8 h.p. J.A.P. engine, New Imperial three-speed gear box with clutch and kick starter, in which is embodied a new type of shock absorber, 28in. x 3in. wheels with Dunlop tyres, and full gear case covering the whole of the transmission, the latter being through Hans Renold chains of great strength. The clutch is hand-controlled from the handle-bar, and is of the double cork inset type. The frame and forks are of great strength, and either pins and nuts or spring washers or cotters are employed throughout.

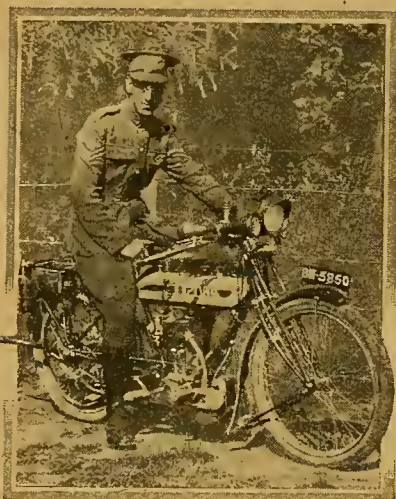
The machine is one primarily designed from one end to the other for hard and continuous service.





### WEAR OF RENOVATED WAR MACHINES.

CPL. W. G. JERMY writes: "I was much interested in your article of August 23rd re 'From Scrap Heap to Complete Motor Cycle.' It is worthy of greater notice even yet. I have had a sample of these home service productions, and can speak from experience. I received a 1914 three-speed hub model Triumph in May, which looked and runs



Cpl. W. G. Jermy, of the 1/6 Batt. Norfolk (Cyclists).

like new. Only one thing put it in the home service category—a crack in the head lug. This had been brazed, but showed itself again after a 240 mile run in one day. A new frame will be supplied in time, and another lug put on the other, and it will be used again, so there is really little waste. We have had very good luck with the hubs; being on home service, we are not lucky enough to possess a countershaft model."

### FLAT TWINS AND CARS IN MESOPOTAMIA.

LEONARD BEES, of the Light Armoured Motor Battery in Mesopotamia, writes: "The cars have done valuable work in this campaign, also some 'impossible' feats, going up to and even through the Turkish trenches upon numerous occasions, over ploughed fields, deep sand, nullahs, and ditches.

"I watched the cars come out of action one evening. It was an inspiring sight to see the little grey objects moving along with H.E. and shrapnel bursting all around, but on they came like taxis threading their way through London traffic. They are at times lost to view,

having vanished down a nullah; these nullahs, or dry canals, are eight or ten feet deep, with one in three sides. Now the cars are lobbing along over ploughed ground. Once more they are lost to view, a big shell having burst just in front, sending up clouds of sand and smoke. White puffs are overhead (shrapnel), but on they come. The shelling has now stopped, as the cars are out of range, and after three hundred yards of low gear work through deep sand they arrive at the camp and draw up in line. Out spring the boys, with the flush of battle still on their faces, and we hear all the great news.

"The day the above happened the Captain was awarded the M.C., and an A.S.C. driver and a sergeant gunner the M.M., so you can guess the work done was highly appreciated at headquarters.

"In conclusion, I must say that the Douglas cycles are wonderful, and are standing the strain (heat, sand, and terrible 'roads') remarkably well. I receive *The Motor Cycle* regularly, and it is highly appreciated by the boys in the battery."

### IN PRAISE OF W.D. MACHINES.

CPL. J. MAZANO, writing from France, says: "Early in 1915 in Egypt my first chance occurred of seeing what a Triumph would do in the way of ploughing through sand. I doubt if many machines of any other make managed to get to the foot of the Sphinx, climbing from the main Mena Road from Cairo, an almost impossible climb, requiring a good deal of foot slogging owing to the loose sand, yet when the summit was reached the engine showed

little or no signs of excessive overheating.

"Then came the sad day of parting with an excellent friend and mount, which I was compelled to leave in Alexandria.

"My next chance of observing my old acquaintance's capabilities was at a well-known motor cycle training centre in England. This was in 1916, when in our spare time Milner (now Lieut.), of the M.T. A.S.C.—once the famous rider of the 2½ h.p. Levis—and I used to provide a fair amount of amusement stunting. Sergt. Milner, as he was in those days, was a daring trick cyclist, and created a sensation by jumping off the engine shed roof on a trick cycle—a sheer drop of about 6ft. This feat a good many motor cyclists who were in training will remember.

"1917 finds me in France once more with that ever-reliable old 'bus, a Triumph. I have covered many miles of road in, I admit, an excellent time of the year, but these roads are often very trying owing to wrecked surfaces due to shell holes and the more than ever excessive and varying types of traffic to which they are subjected. The worst part of the year has yet to come, however; but I am sure that, even under the worst conditions, the Triumph will hold its own as it has hitherto done, and motor cyclists who were on the Somme last year will swear by a Triumph over anything.

"I trust this has not bored you to tears, and hope you will use your valuable columns as a means of displaying my idea, which will probably be of use to quite a few motor cyclists." [Cpl. Mazano's "tip" will be found on the "Ideas" page.—Ed.]



A section of motor cyclists attached to the Norfolk Reg. (Cyclists). Reading from left to right: Pte. Bright, Pte. Wood, Cpl. Jermy, Lt. G. Hill, L.-Cpl. Watson, Pte. Snelling, Pte. Worrell.



# MOUNTING THE GAS BOLSTER.

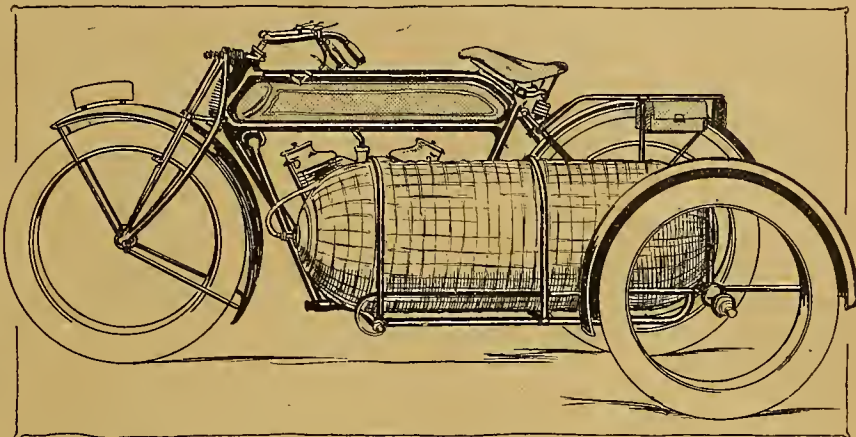
## SUGGESTED METHOD OF EQUIPPING THE MOTOR CYCLE WITH THE WOOD-MILNE FABRIC AND RUBBER CONTAINER.

**S**HOULD the employment of coal gas as a fuel for motor cycles develop, as we hope it will, in the near future, the illustrations on this page may convey some idea as to how we may expect to see touring machines equipped. Unfortunately, the gas container, if it is to withstand very high pressures, must be cylindrical in shape to obtain the necessary tensile strength, otherwise containers of freak shapes could be made to occupy such odd nooks and corners of the sidecar body that special design might permit, which would be vastly preferable to carrying a clumsy bolster.

### Will the Pressure Cylinder come to Stay?

Though, naturally, we extend every hope that the pressure cylinder will become an accomplished fact, adaptable to everyday use, we are by no means convinced that all the difficulties it suggests will be so easily surmounted as many optimistic supporters of the idea suppose. To our minds, it is still an open question as to whether a bolster capable of containing gas equivalent to more than threequarters of a gallon of petrol will be arrived at for motor cycle use, and the matter of pumping up the container is not to be dismissed lightly. In the face of urgent demand, however, these difficulties are likely to be overcome to an extent which will be of enormous benefit to the everyday rider, whose necessary trips are of a to and fro order, allowing ample time for recharging.

The system promises to meet to a certain point the requirements of all



A Wood-Milne container of this size could carry sufficient gas to run a sidecar a hundred and twenty miles.

classes of riders. Those who wish to make long journeys will probably have to resort to the attachment of a sidecar chassis for mounting a bolster of sufficient dimensions. Such a method, shown in one of our illustrations, should enable the rider of, say, a 6 h.p. machine to make journeys of one hundred miles or so without recharging, and one advantage of coal gas is that, unlike petrol, constant stopping and starting work will not entail wastage of fuel. Every rider knows that greater petrol economy is obtained when making a long non-stop run than when constantly stopping and starting on various short trips. The loss is brought about largely by imperfect combustion, condensation, etc.—defects inherent to a liquid fuel, which will play no part when dry gas is used.

### Convenience of Carriage.

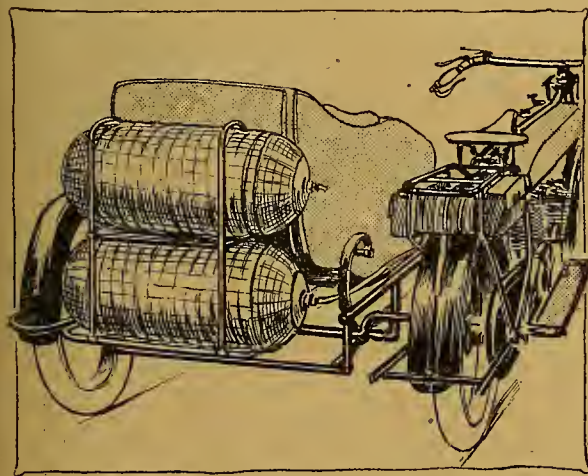
As regards the weight of the gas bolsters, this is not a matter presenting any great obstacle. The large bolster mounted on the sidecar chassis in one of our illustrations would certainly weigh no more than a light body, and would present less wind resistance than the latter. A spring luggage box could be mounted at the rear of the chassis for one's personal effects, and such an outfit would then prove thoroughly useful.

The other two methods our artist suggests have their respective merits. The position of the two bolsters outside the footrests of the solo mount does not appeal as highly practicable, yet it seems almost the only solution to the difficulty. The cylinders should really occupy a sheltered position, secure from mud and water, and well out of the way in case of a fall, for, though exceedingly tough, the bursting of a bolster in confined surroundings—or even in the open road if the

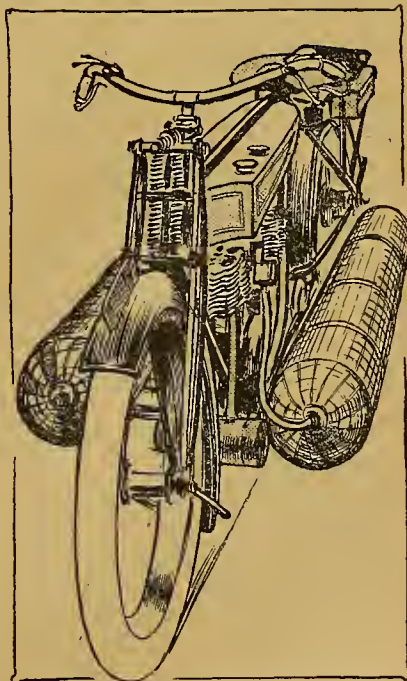
machine were stationary and there were no wind—would probably mean the gassing of the rider, which, though not likely to be fatal, would be an exceedingly unpleasant experience.

Of course, whatever advantages may be put forward regarding the Wood-Milne fabric and rubber bolster apply equally to the metal cylinders, so far as compactness goes. The manufacture of metal cylinders, however, has been prohibited by the Government, so even if their weight did not debar them from practical use on motor cycles it would be impossible to obtain them.

But the invention of Mr. John Muir and Mr. H. B. Potter, of the Wood-Milne Tyre Co., is light, compact, and perhaps safer than metal cylinders, and is capable of withstanding a pressure of 1,000 lb. per square inch.



The most attractive proposition is to carry the gas on the luggage grid.



The appearance of a solo machine fitted with gas containers in place of the footboards.



# LETTERS to the EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Herford Street, Coventry, and must be accompanied by the writer's name and address.

## THE PRODUCTION OF AIRCRAFT.

Sir,—Realising the importance at this juncture for straining every nerve to accelerate the production of aircraft, we should feel grateful if you could find space to publish this letter inviting the smaller engineering and other firms, not fully engaged on war work, and capable of doing work in connection with the making of aircraft parts, to communicate with the Institute.

There are, at the present moment, hundreds of small firms whose facilities are not yet completely utilised. By some slight organisation, on a voluntary basis, their co-ordinated output, however, would be as important to the country as that of four or five large firms. Hence our desire to try and bring about such co-ordination.

L. BLIN DESBLEDS,

Hon. Director.

The Aeronautical Institute of Great Britain, 3, Arlington Street, St. James's, London.

## SPARKING PLUG TESTS.

Sir,—We think it may be of interest to your readers if we confirm the results of Mr. Stephenson's experiments which were described in *The Motor Cycle* of October 18th.

The plan of testing the insulation by means of a megger at various temperatures is part of our regular tests on all new insulating materials. In our case we test at a pressure of 2,000 volts, so as to approach more nearly the working conditions, and our testing plant is arranged so that a considerable number of different materials can be tested simultaneously.

Below we give a table of average results:

RESULTS IN MEGOHMS.

	100° C.	200° C.	300° C.	350° C.	400° C.	450° C.	500° C.
Insulator A	Infinity	Infinity	Infinity	9,000	1,600	750	450
Insulator B	Infinity	Infinity	1,000	100	15	0	0
Insulator C	3,000	1,000	10	0	0	0	0

A represents a mica insulator.

B represents the best English, French, or German porcelain or steatite that is now, or has been, on the market.

C represents some American porcelains.

It will be observed that the mica insulator comes out very much the best.

The best porcelain and steatite insulators are all very equal, and their insulating properties under heat are all that are required for ordinary motor car or motor cycle engines.

The American porcelains also are quite suitable for low-efficiency engines, but at a temperature of 350° C. they would misfire owing to the current leaking through the insulator instead of jumping the spark gap.

In our tests the figure of temperature represents the mean cylinder temperature, and not necessarily that of the sparking plug.

Now with reference to the suggestion that the failure of ignition on a hot engine may be due to the silent discharge of the spark, we may say quite definitely that such is not the case. The failure is fully explained by the effect of heat on the insulator. The hottest temperature at present reached in an internal combustion engine occurs in the latest aeroplane engines, and we have never known a case of failure to ignite by what has been called a "silent discharge."

THE LODGE SPARKING CO., LTD.,

ALEC M. LODGE, Director.

Sir,—I notice that Mr. Stephenson has been verifying experimentally the suggestion I put forward in a letter in your issue of September 14th, 1916, that plug failures, as distinct from pre-ignition, are mostly due to the effect of heat on the insulation.

I consider that his results support my contention, whereas he himself still clings for an explanation to the idea of a "silent discharge." From the results of his tests there is no evidence which would lead one to the latter conclusion as a cause of plug failures.

The now generally accepted view, that the power of a spark to produce ignition depends on the rapidity of the rise of potential and on the maximum value thereof attained before the spark passes, admits of a justifiable explanation of these plug failures.

Failure invariably occurs when an engine is working under heavy load. The consequent high compression at the instant of ignition requires a higher potential to be reached before the spark will jump the gap. Now the presence of an alternative path to the gap due to the reduced resistance of the plug insulation at the higher working temperature has the effect of retarding the growth of potential in the magneto secondary winding and also of reducing its maximum value. Two possibilities then may occur. Either the potential will fail to reach that value required to break down the gap, and no spark will pass, or, if a spark does pass, it, owing to the slower rate of increase of potential, may not possess the property of igniting the mixture. In each case ignition fails owing to faulty sparking plug insulation.

It is to be understood that the limiting value of insulation resistance—it may in certain cases be as high as several megohms—at which failure to ignite the mixture occurs, will depend partly on the design of the magneto; and it is quite probable that a plug may behave perfectly on one machine and yet give decidedly unsatisfactory service on another.

It follows, *a priori*, that a change of plug may completely cure this so-called "overheating" due to the higher resistance of the insulation of this new plug at the temperatures reached. This answers the question raised by "Ixion" in a former issue.

May I add a last word to congratulate the author on his carefully carried out experiments, and on his very instructive endeavour to reach conclusions on this elusive subject of spark phenomena? A.K.

## GAS CYLINDERS FOR MOTOR CYCLES.

Sir,—I have read with much interest the discussions which have appeared from time to time in your paper on the above subject. and in your issue of October 18th I notice you say that a cylinder made of the best material to contain fifty cubic feet of gas would weigh 35 lb. May I venture to contradict this statement for the following reasons?

In every hollow cylinder of uniform thickness subjected to internal pressure the cylinder is capable of resisting rupture along the longitudinal seam only half what it can resist along a circumferential seam. This is a well-known fact, the proof of which can be found in almost any text book on engineering. Now it follows, of course, the cylinder must be designed strong enough to resist longitudinal rupture, hence it has twice as much strength as necessary to resist circumferential rupture: thus half the weight of the cylinder is, in a sense, superfluous.

Now if a cylinder is wound round with high strength gun-wire at a certain tension the tendency to resist longitudinal rupture can be immensely increased.



Ordinary commercial steel plate has a breaking stress of about thirty-two tons per square inch; gunwire has a breaking stress of 130 tons per square inch, viz., about four times as strong. If a cylinder is wound with this wire at correct tension it can be made  $\frac{1}{4}$  thickness of a cylinder not wound. We now have a cylinder twice as strong to resist longitudinal rupture as it has to resist rupture at the circumferential seams—the exact reverse of the first case.

To make these values equal can be easily done by the introduction of longitudinal stays with very little increase of weight. Of course, the circumferential winding only gives strength to resist rupture along a longitudinal seam. This, at first sight, may sound paradoxical, but a little thought will show the correctness of the statement. If this wire-winding method is carried out, it is a simple matter to design a lap-welded steel tube wire-wound cylinder to contain 250 cubic feet of gas compressed into a cylinder of  $12\frac{1}{2}$  cubic feet capacity at a pressure of 275 lb. above atmospheric pressure. Such a cylinder would be approximately 18in. diameter  $\times$  7ft. long. The material could be stressed to thirty-five tons per square inch, leaving a factor of safety of 3.7 to 1, and would weigh about 60 lb. Taking the basis of fifty cubic feet = one-fifth of a gallon of petrol, we have in the compressed cylinder a quantity of gas equal to one gallon of petrol.

With such a wire-wound cylinder it will be seen that 1 lb. weight of cylinder carries  $4\frac{1}{2}$  cubic feet of gas, whereas the figure for the unwound cylinder is  $1\frac{1}{2}$  cubic feet per lb. of cylinder, showing a distinct advantage in favour of the former.

The problem of compressing gas is, of course, another story, but with a water-cooled engine it might be possible to carry a small compressor, thus enabling the motorist to charge at high pressure from the ordinary low pressure gas main. This method would be more adaptable to cars, as the additional weight would be a serious item to a motor cycle. Referring to the above wire-wound cylinder, this, of course, would be carried on a sidecar chassis.

J. C. SOTHAM.

Sir,—Regarding calculations for gas holders in your paper of 11th inst., has Mr. Prescott not made a mistake in his circumferential and longitudinal stresses?

A law of hydrostatics says: In a closed vessel the total pressure in the direction of the axis = pressure of the projection of the area of the pressures on a plane at right angles to the axis.

(1.) Longitudinal stress:

Pressure:  $(p - p_0) \times l \times 2R$ .

Metal area:  $2 \times l \times t$ .

$$(p - p_0) \times l \times 2R = 2 \times l \times t \times ft.$$

(ft = tensile stress.)

$$t = \frac{(p - p_0) \times R}{ft}$$

the same as Mr. Prescott is using for circumferential stress.

(2.) Circumferential stress:

Pressure:  $(p - p_0) \times \pi R^2$ .

Metal area:  $2 \pi R \times t$ .

$$(p - p_0) \times \pi R^2 = 2 \pi R \times t \times ft.$$

$$t = \frac{(p - p_0) \times R}{2 ft}$$

=  $\frac{1}{2}$  longitudinal stress.

This is the same for a spherical vessel, as the projection of the spherical vessel is the area of a circle.

May I refer Mr. Prescott to Goodman, "Mechanics Applied to Engineering," page 403, where he will find: "In order that the hemispherical ends of boilers should enlarge to the same extent as the cylindrical shells when under pressure, the plates in the ends should be three-sevenths thickness of the plates in the cylindrical portion."

To the thickness of the wall of the cylindrical portion, a constant is added for practical reasons,  $t = \frac{(p - p_0) \times R}{ft} + C$ , as otherwise when  $p$  and  $D$  are small, the thickness would become less than is necessary for working the sheet steel.

C. TER COCK.

We submitted this letter to the writer of the article, who replies as follows:

Sir,—Mr. Ter Cock's difficulty seems to be one of words. He does not appear to know which is a circumferential stress

and which is a longitudinal stress. He gets my results, but gives them wrong names

With reference to his second point, about the thickness of the hemispherical ends, I did not suggest that it was the best procedure to make the ends as thick as the cylindrical part. In order to get the same stresses the ends should be half as thick, and to get the same strains they should be about three-sevenths as thick as Mr. Goodman suggests. But it would certainly do no harm to make the ends as thick as the body, for this would merely strengthen the hemispherical ends and the end portions of the cylindrical part as well. The small amount of bending introduced would give rise to only small stresses.

The main point of my paper was to find the weight of metal necessary to carry a given amount of gas, and the only part of Mr. Ter Cock's letter that criticises my statement is the first part, in which he fails to distinguish between the words circumferential and longitudinal.

J. PRESCOTT.

### INTERNAL COOLING.

Sir,—Your correspondent "H.A." agrees that insulating the piston top will tend to preserve the qualities of the lubricating oil, but admits that he could not follow the subsequent arguments on the engine efficiency.

As regards the latter portion of the article mentioned, it was not my intention to put forward increased efficiency as an advantage which would in itself warrant the fitting of an insulated piston, but rather to show that, taking into account the heat received by the piston in the two cases—(1) insulated and (2) uninsulated—the tendency would be to increase the engine efficiency, and not to lower it with the insulated type of piston.

"H.A." will, perhaps, excuse my insisting that I am still in the track and have taken no turning at all. Perhaps I appeared to leave it when he commenced to talk about insulated cylinders whilst the subject I had under consideration was pistons! A case of relative motion, or aberration. However, I am quite willing to discuss the *pros* and *cons* of swathing the cylinder in asbestos—provided when that subject is *sur le tapis* we keep to it

ENGRO.



A French despatch rider aboard a W.D. Triumph. The scene is in the proximity of the Verdun front.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of the envelope, and should be kept distinct from questions bearing on technical subjects.

## Laying up a Motor Cycle.

**?** In view of the new petrol restrictions, I am laying my machine up. Please tell me the best way to treat the frame and tyres to preserve them in good order.—A.W.S.

All parts which can rust should be liberally smeared with vaseline. The tyres may be taken off and hung up in a cool, dark place, such as a cellar, and the inner tubes stored in a box of French chalk, or, if the tyres are left on, both wheels should be kept clear of the ground.

## Unsatisfactory Running.

**?** I have a 1913  $3\frac{3}{4}$  h.p. Precision, fitted with a Brampton variable gear, B. and B. carburettor, 29 jet, running on paraffin. I have been running on this fuel for about four months, and about three weeks ago I could get 50 m.p.h. by the speedometer. Lately, however, when on top gear and accelerating, and an appreciable number of revs. is approached, the engine chokes, or misfires, throwing me forward in the saddle, but only for a moment, as it immediately goes on again to repeat the performance a few yards further on. At the time of writing, if I go out on the machine it is only by careful manipulation of the throttle and air levers that I can obtain 30 m.p.h. The acceleration is poor, but the machine runs quite well at slow speeds. I have never troubled about a vaporiser, as my carburettor has such a short inlet pipe that I thought one unnecessary, because after two minutes running on paraffin the carburettor gets too hot to put one's hand on. At first I put the jerks down to seizure, but two or even three pumpfuls of oil fail to mend matters. For its capacity the machine is economical, and runs 95 m.p.g. on paraffin. Would fitting (1) a fresh plug (the present one gets very hot), (2) a larger or smaller jet, (3) a hot air intake, or lowering the petrol level effect any improvement?—D.M. 384.

Probably the trouble is due to the fact that your carburettor does not take the air in warm, and it has only lately developed because the weather has become colder. (1.) You might try cleaning the carbon deposit from the engine and using a fresh plug. (2.) The size of jet should be about right. (3.) This question has been already answered. Altering the petrol level should not be necessary.

## A Leak in the Tank.

**?** The tank of my new 1917 motor bicycle has sprung a leak for several inches across the bottom where it is fixed to the fore part of the frame, and lets out the petrol rather badly. I have had it soldered three times, but it starts leaking again every time a few days after it is done. What is the best thing to do with it?—M.C.S.

We fear that you do not sufficiently explain the position of the leak. If it is at the edge of the tank and you can conveniently fit an angle piece round it, this should be done. The angle piece should be made out of sheet brass or tinned sheet iron, and should be well tinned with solder before being placed in position, and then very carefully soldered on. Use only a hot iron, under no circumstances a blow lamp.

## IMPORTANT NOTICE.

### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

LIFFE & SONS LTD.

## Overhauling.

**?** I have seen several times in your most interesting paper that when overhauling a machine it is even more important to clean the inside of the piston than to clean the top and sides. Will you please tell me: (1.) Why is this so important? (2.) How does the carbon get deposited there? I should have thought that, provided the piston rings were working properly, this would be impossible.—C.A.H.

(1.) One reason is that the weight of the carbon on the inside of the piston would affect the balance. (2.) The carbon deposit is caused by the tremendous heat of the piston, which, working as it does in a shower bath of oil, naturally collects a thick coating. Of course, it is none the less necessary to see that the piston rings are working properly and freely. It should be obvious that the rings cannot prevent carbon from forming inside the piston.

## Pre-ignition.

**?** Three weeks ago I purchased a 1917  $2\frac{1}{2}$  h.p. three-speed Douglas, fitted with an Amac carburettor, Thomson-Bennett magneto, etc. The last few days, when it has run five or six miles and gets warm, it suddenly eases up, will not take top gear, and eventually stops. After cooling for a few minutes, it goes splendidly again, only to develop the same trouble later. I am using a 27 jet. It seems to misfire, and will not take full air.—J.W.L.

The trouble is due either to pre-ignition, owing to the use of an unsatisfactory plug, or to the fact that the valve tappets require adjustment. Check the clearance when the engine is warm, and if it is seen that one (or more) of the valves is not closing properly you will be able to locate the trouble. The clearance should be about the thickness of the blue cover of *The Motor Cycle*.

## Anti-freezing Mixtures.

**?** Having bought an 8 h.p. water-cooled Williamson, I am writing to ask you if there is anything on the market I could get to mix with water to stop it from freezing; if not, how long do you think the water would stand before it would freeze on a hard frosty day after a run?—J.J.P.

There are several anti-freezing mixtures—such as calcium chloride in the proportion of four to five pounds of chloride to one gallon of water—which are very effective. It is inadvisable to use the mixture except when absolutely necessary, as it has a slight corrosive effect on the metal work. This corrosive action, however, can be eliminated by adding about a handful of washing soda. The soda and the chloride must be dissolved in hot water, and stirred well before being poured into the radiator, which should be done through a strainer. It is inadvisable to use this mixture where any part of the cooling system is constructed of aluminium. A mixture of glycerine and water can be used. Ordinary glycerine is very expensive, but commercial glycerine is quite good enough for this purpose. A ten per cent. solution freezes at 30°F., a thirty per cent. doing so at 25°F., and a forty per cent. at zero. Glycerine is almost impossible to obtain at the present time. Of course, it is advisable to throw a covering over the radiator while standing, so as to prevent radiation. This would keep the engine warm for probably over an hour.



**Two-stroke Lubrication Difficulty.**

I have a 3 h.p. two-stroke Omega motor cycle, which has run 250 miles on pure paraffin. I have a hot air intake. I find upon dismantling the engine that the roller bearing of a big end has worn out, due, I believe, to insufficient lubrication. (1.) Can you explain this or suggest a remedy? The lubrication is by drip feed to induction pipe. (2.) Would petrol lubrication solve the problem?—K.C.K.

(1.) We should say that the only remedy would be to adjust your drip feed to run faster, and, of course, renew the bearing. (2.) The petrol system would not solve the difficulty.

**Enamelling the Frame.**

Will you please furnish me with some "Hints and Tips" for enamelling the frame of my motor bicycle at home? (1.) What kind of enamel is most suitable? (2.) How many coats should be given? (3.) Would putting the frame into a yarn drying stove, heated by steam pipes to about 120° F., be an advantage? (4.) Are black japan and carriage varnish any use? I did part of the frame this way last year, and found that it was fair on the top bar, but near the engine, where heat and lubricating oil were present, it peeled off after some time.—T.A.

(1.) What we should suggest is that you use such an enamel as Robbialac or Vehmure. (2.) Try about three coats. (3.) The correct temperature for stoving a machine enamelled in black is 300°, so we fear that the temperature which you gave would not help much. If you enamel in grey, on the other hand, you can do with as little as 140°, and the time required is from four to six hours. (4.) We should say that the two preparations mentioned above would be more suitable.

**Lighting by Dry Battery.**

I am thinking of using electric light on my motor cycle this winter, but my knowledge of electricity is exceedingly small. I thought of using a Hellesen dry battery of the "Flight" or "Flash" type. This type is supposed to last for 1,500 miles when used for ignition purposes. How many hours light could I expect from one? Could I employ a rear lamp, using the same battery as for the head lamp? If these suggestions are impracticable, will you kindly give me a few hints as to how I can fit up a solo motor cycle with electric lighting as economically as possible?—P.S.

You can use a dry battery for the purpose suggested in your letter, with a bulb consuming .3 of an ampere in the head lamp and a bulb consuming .2 of an ampere in the tail lamp. You could get sixty to seventy hours intermittent light with a dry battery. If used, however, for continuous work it would soon exhaust itself, so this type of battery could not be used for a very long time. An accumulator would be fairly satisfactory, but it would be heavy and would need charging at least once a month.

**Carburettor Blow-back.**

(1.) I have a 2½ h.p. Singer motor bicycle, which, when running at any speed, blows petrol back through the carburettor air intake. Both valves are well ground in, and the compression is good. When both wheels are on the ground the petrol level is exactly at the top of the jet. Is this too high, and, if so, how is it to be remedied? The carburettor is a B. and B. (2.) What is the average m.p.g. of this machine? At present it is about eighty, which I consider very poor. (3.) Would the high level account for this? I always run on petrol. (4.) What is the proper high gear ratio of this machine?—H.W.

(1.) The blow back is probably caused through too weak an inlet valve spring. The petrol level seems just a trifle too high. It may be lowered by raising the shoulder on the needle valve on which the float rests. (2.) The petrol consumption should be about 100 m.p.g. (3.) The high level might account for this. (4.) We should say that the best gear ratio would be 5½ or 6 to 1.

**Overheating.**

I tightened the magneto chain on my 6 h.p. Bradbury and then started on a forty mile journey. The engine ran more warmly than usual at first, but pulled well. After twenty miles the engine began to roast, and I had to stop half an hour for cooling. It got hotter and hotter, and at last would climb nothing, and the air round the cylinder shimmered with the heat. I found the magneto chain very slack, the platform

nuts having allowed movement. Would this slackness account for this? I am trying to retune it according to the magneto makers' instructions. I slackened the nuts on the magneto shaft, removed the chain, set the points, and replaced the chain and nut, but only got back firing on attempting to start. I think that in tightening up the nut on the shaft the adjustment alters. Need it be only finger tight?—F.W.C.

Evidently, for some reason or other, the timing has slipped and the engine is firing late. We should recommend you to check the timing with that given in "Motor Cycles and How to Manage Them." The nut on the magneto shaft should be dead tight.

**RECOMMENDED ROUTES.**

NOTTINGHAM TO WATER BEACH.—T. Nottingham, Melton Mowbray, Oakham, Stamford, Wansford, Stilton, Huntingdon, Godmanchester, Fenstanton, Water Beach.

WOLVERHAMPTON TO DYFFRYN.—T.W.N. Wolverhampton, Shifnal, Wellington, Shrewsbury, Llangollen, Corwen, Bala, Dolgelly, Barmouth, Dyffryn. Approximately 110 miles.

BIRMINGHAM TO SLEAFORD.—D.H.C. Birmingham, Coleshill, Nuneaton, Hinckley, Leicester, Melton Mowbray, Grantham, Sleaford. Approximately 80 miles.

BARROW TO SCARBOROUGH.—J.W.B. Barrow, Ulverston, Newby Bridge, Lindale, Levens Bridge, Kendal, Sedburgh, Hawes, Aysgarth, Wensley, Masham, Thirsk, Coxwold, Helmsley, Kirby Moorside, Pickering. Scarborough. The direct road from Thirsk entails the climbing of Sutton Bank, and we do not recommend this unless your machine is a good hill-climber.

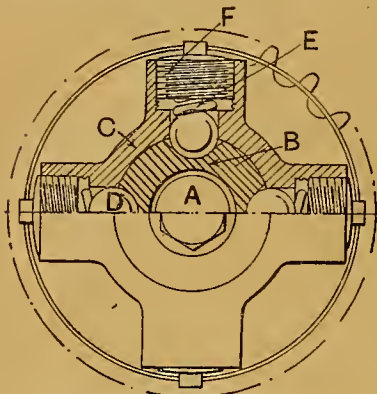
**COUNTRY INNS WITH HISTORIES.**

(Top) An old inn near Darlington, known as Baydell Beck Inn. Legend has it that the famous highwayman, Dick Turpin, stayed here at various times. (Bottom) An old inn at Piercebridge, co. Durham. It was here that the "Grandfather's Clock" stood some years ago that inspired the old song of that title.



**A Shock Absorber.**

Upon the engine-shaft A is secured a driving sleeve B, around which is mounted the driven member C carrying the chain sprocket. The sleeve B is formed with recesses to receive balls D, which engage partly with the sleeve B and partly with the driven member C,



in which passages are formed for this purpose. The balls are normally pressed inwards by helical springs E retained in position by screw plugs F. It will thus be seen that the balls are free to yield under violent impact from the driving sleeve B. Spherical-ended cylindrical rods may be used in place of the balls if preferred.—H. Stevens and A. J. Stevens and Co. (1914), Ltd., No. 108,077.

**British Magnetos.**

It will be of interest to many to know that Dixie magnetos were fitted to the aeroplane used in the recent wonderful non-stop flight from Turin to London. The engine was a F.I.A.T.

**Increase in Price.**

Messrs. Ward and Goldstone, Sampson Works, Salford, Manchester, inform us that, owing to the difficulties of manufacture at the present time, they have had to increase the price of the Voltalite self-generating sets.

**Milling Machines.**

We have received from W. A. Walker and Co., Victoria Street, London, a copy of a pamphlet entitled "Precision Hand-milling Machines," which shows machines specially designed to fill the demand for a small accurate machine for jig gauge and tool room work.

**Clutch Slip.**

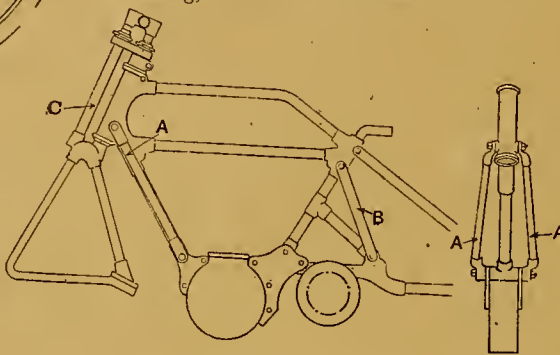
Messrs. Sterns, Ltd., Finsbury Square, London, E.C.2, write to say that they have for years past specialised in an oil for clutches, which is marketed under the name of Clutcholine. This can be obtained through all dealers.

**Norton Booklet in Russian.**

Messrs. Norton Motors, Ltd., Birmingham, in view of the great many Nortons in use in Russia, have published an instruction booklet and parts list, written in that language. It is brightly illustrated, and will no doubt be found a boon by many riders of this popular machine in Russia.

**Method of Frame Strengthening.**

The frame illustrated is strengthened by means of pairs of tubes A and B, arranged on either side. The front strengthening tube A, as will be seen, runs from the lower part of the steering head down to the front engine lug, whilst the rear supporting stays B extend from the seat pillar lug to a point just behind the gear box. These stays may be secured either by screws or by brazing, but it is mentioned that nor-



mally they should neither be in tension nor compression, so that in effect they would only come into operation under exceptional stresses. At the front there is shown a peculiar fork construction, which also is provided with a strengthening member C, but the present specification does not give details of the springing arrangement to be used with the fork member shown.—G. E. Rigby, No. 107,793.

**A Lighting System.**

The system illustrated, while apparently designed primarily for use with pedal cycles, may possibly be applied to motor cycle purposes. The lamp A is arranged so that the light is on a level



with the top tube B of the frame, and this tube is open throughout its length, and is provided with a lamp body C at its rear, so that light from the main lamp travels to the rear, enabling one light to serve both purposes. The front lamp does not, however, move with the front wheel, and the rear light will be somewhat obscured by the head and seat pillar.—G. Bothwell, No. 107,188.

**New Address.**

The address of Mr. Ernest Garton, honorary secretary of the British Ignition Apparatus Association, is now No. 9, Northumberland Road, Leamington Spa, to which all letters and communications in connection with the Association should be sent.

**Autobiography of a B.S.A.**

The B.S.A. Co., Ltd., Birmingham, have issued a novel little brochure in the form of an autobiography. It gives the "life" of a B.S.A. motor cycle from its infancy to a time when 10,000 miles have "rolled beneath its wheels." To B.S.A. riders, and indeed any motor cyclist, this rather refreshing way of "laying out the goods," so to speak, will make special appeal. A copy will be sent to any of our readers on application to the company.

**Dreadnought Motor Policies.**

In view of the increased liability attaching to employers under the Workman's Compensation Act, and the short time available to make any alteration in insurances, the underwriters have decided to assume that all Dreadnought policy holders will desire the extra risk covered, and are therefore including this without additional premium under all existing policies, both for private car and commercial vehicle drivers. The premium for the renewal of policies covering private car drivers will not be increased, but for commercial vehicle drivers renewal premiums will be increased by 10%.

**New Address.**

J. A. Ryley, 73, Weaman Street, Birmingham, who bought the stock of J. C. Meredith, Ltd., tells us that many customers still send to the old address, which entails delay. Letters and orders should be addressed as above.

**Miles per Gallon.**

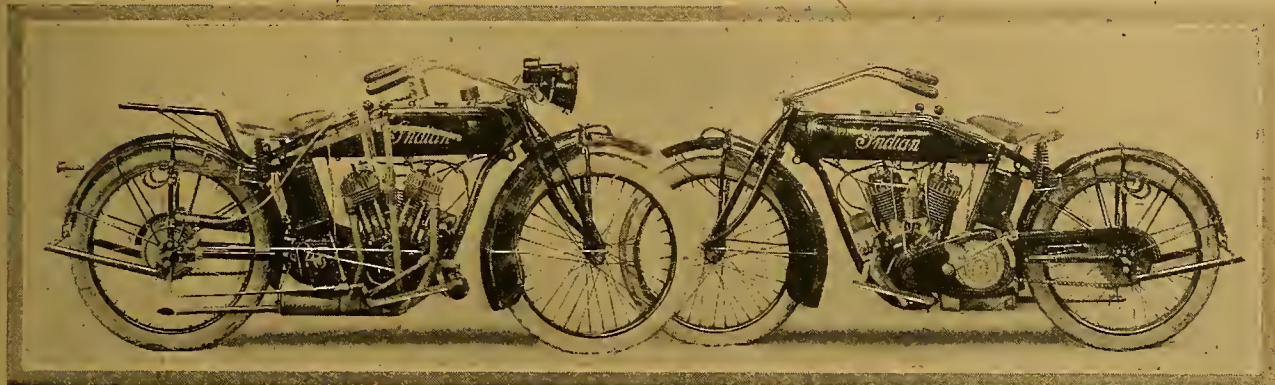
"Notes on Fuel and Oil Economy," by J.W.G.B., published by Prices' Co., Ltd., Belmont Works, Battersea, London, S.W.11, and sent free to applicants. A very interesting little treatise on the best way of rendering one's mount economical. All the information is sensible, and it is written by one who has considerable scientific attainments, and who has studied the internal combustion engine from its inception. It is in no sense an advertisement for lubricating oil, but deals with the question of economy in a very thorough manner. It is pointed out that the engine should work smoothly, that the ignition should be accurately timed, that the cooling should be uniform, and the vaporisation perfect. Great emphasis is laid upon the importance of vaporising the fuel properly.



1918  
Powerplus

# Indian

Motocycles



Which we trust will be Post-War Models.

We regret that we are not in a position to supply motorcycles or send out catalogues at the present time, but when we are able to do so we will freely advertise the fact.



**HENDEE MANUFACTURING CO.,**

"Indian House," 366-368, Euston Road, London, N.W.

Telephone: Museum 1648.

Telegrams: "Hendian, Euston Road, London."

AUSTRALIA, 109-113, Russell St., Melbourne.

CANADIAN WORKS, 12-14, Mercer St., Toronto.

AFRICA, Indian House, 127-9, Commissioner

Street, Johannesburg.

Indian House, 579, West Street, Durban.

Indian House, Strand Street, Port Elizabeth.

## Cut down Tyre Bills

The man whose tyres last longest is he who repairs the small cuts in his covers directly they appear—a simple matter for anyone who uses a

## SIMMS VULCANISER

which does not depend on the skill of the user. It is the old story of "a stitch in time saving nine." Have you a Simms Vulcaniser?

Price, ready for instant use, 24/-; smaller size for tubes only, 15/-.



ALL DEALERS, AND  
**SIMMS MOTOR UNITS,**  
Limited,  
Percy Buildings, Gresse  
Street, London, W.1.

THE varied uses and adaptation of Bowden Wire mechanism is recognised by almost every department of State Service. The work which we have in hand for Home and Allied Governments precludes, for the present, our acceptance of private orders.

*Established 1897.*

# Bowden Wire Ltd.

**LONDON**

VICTORIA ROAD  
WILLESDEN JUNCTION, N.W.10



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/8, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd.**, and crossed **& Co.**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**ABINGDON** King Dick, 1914, 5-6h.p., Gloria de Luxe sidecar, perfect condition; £65, or nearest; would separate.—Flat 2, No. 6, Cranworth Gardens, Brixton Rd., London. [9821]

**ABINGDON**, 1914, 3½h.p., single-speed, adjustable pulley, Bosch mag., and pan seat saddle; £28; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7859]

**ABINGDON** King Dick, 6h.p., 1915, with counter-shaft 3-speed gear, C.B. sidecar, and complete equipment, a very fine and desirable outfit, reasonably priced.—Full particulars from Layton's Garage, Bicester. [X7676]

### A.J.S.

**A.J.S.** Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [9868]

**A.J.S.** 5h.p. Combination, complete, lamps, Lucas horn, very good order; £30.—Walsall Garage, Walsall. [X7708]

**A.J.S.**, new, 3-speed, 2½h.p., sporting model; delivery from stock; no waiting.—A. W. Buckingham and Sons, Chelmsford. [9823]

**A.J.S.** 4h.p. Combination, 3-speed, late 1915, lamps, horn, complete; £80; not done 2,000.—Pickering, Mardol, Shrewsbury. [X7741]

**A.J.S.** 1912 5½h.p. Combination, recently overhauled, new tyres, splendid running order; £30.—124, North Rd., Preston, Lancs. [X7718]



PAT. NO.  
16498/09

The Forward, 1/6

## FINDING A FASTENER.

That's easy, but to select the one which will excel in wearing qualities and efficiency is a different matter.

In your search if you've tested a

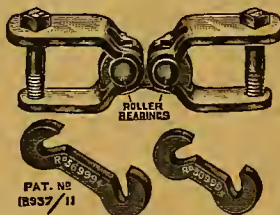
## FORWARD

you're not looking any longer, but if you've not, we contend you have not found "the best."

We depend on test to prove the super service of our products, and ask you to make it.

Fully illustrated Catalogue free.

**FORWARD MOTOR CO.**  
35, Forward Wks., Summer Row,  
BIRMINGHAM.



PAT. NO.  
16337/11

The King Hook.  
Detachable, 1/- Adjustable, 1/3

## EAGLES-N.S.U.

### 2-Speed Gears with Free Engine

(Acknowledged to be the most perfect of its type upon the market).

With fixed pulley, £7 7 0 Adjustable pulley, £7 17 6

Easy to fit. No alteration necessary to motor cycle.

Supplied for Triumph, B.S.A., Bradbury, Rudge,

Precision, Premier, Singer, Rover, and other makes.

Trade enquiries invited. Spares for N.S.U. Motor Cycles.

**EAGLES & Co., Acton Hill Works, Acton,**

Telephone: 556 Chiswick. LONDON, W.3.

## Photography

Every Wednesday. Twopence.

## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**1914 A.J.S.** Combination, 6h.p., hood, screen, speedometer, and lamps, all in good condition; £57.—Ross, 86, High Rd., Leam. [9792]

**A.J.S.**, 1913-14, 2-speed gear, clutch, and kick-stator £37/15; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7833]

**A.J.S. Motor Cycles.**—We have always a good selection of 1915-6-7 models in stock. Write for particulars.—A.J.S. Specialists, Walsall Garage, Walsall. [X7711]

**COAL Gas.** Any combination equipped.—1916 A.J.S. de luxe combination, spare wheel, etc.; 89 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [9922]

**A.J.S.** 1916 6h.p. Combination, wind screen, Lucas electric lighting set, electric horn, speedometer spring saddle; any trial: £108.—F. Saunders, 2, Singde Rd., Lavender Hill, S.W.11. [9822]

**2½h.p. A.J.S.**, 1916 (August), 2 speeds, clutch, kick starter, speedometer, lamps, spares, in splendid condition, mileage 3,000; offers above £45.—Wright Myrtle Villa, Porton, Whitehaven. [X7722]

**A.J.S.** 6-8h.p. Combination, late 1914, De Luxe side car, all enclosed hood, screen, luggage carrier, spurt tube and cover, 3 tins of petrol; owner left for France machine in tip-top condition; £65, no offers.—154, Holland Park Av., W.11. [9639]

**A.J.S.** 1916½ Combination, 6h.p., Lucas dynamo lighting set, with electric horn and inspection lamp, detachable wheels, with spare wheel complete, spring seat pillar, screen, luggage carrier, Watford speedometer handle-bar timepiece, spare chain, valves, complete set of nuts, spare plugs, etc., splendid condition, insurance policy: £102.—45, Brook Rd., Meersbrook, Sheffield. [X7744]

### Alldays.

**COLMORE** Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [9799]

**1915 Alldays** Allon, 2-speed, in good condition; £25 seen any time.—Bounds, Garage, 225, High Rd., Kilburn. [9861]

**1915 2½h.p. Allon**, single-speed, new condition, with insurance, spares; £24.—73, Victoria Rd., Stroud Green, N.4. [9851]

**ALLDAYS** Allon, 1917, lamps, horn, 2-speed, run under 500 miles; £42.—Sussex Garage Co., Gram Parade, Brighton. [X7670]

**ALLON**, 1915, 2½h.p., 2-stroke; £25; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7761]

**ALLON**, 1916, 2½h.p., 2-stroke; £30; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7761]

**ALLON**, 1917, 2½h.p., 2-stroke, 2 speeds; £40; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7761]

**ALLDAYS** Matchless, 1913, 3½h.p., 3-speed, £25 coachbuilt sidecar, £7/10; speedometer, 30/-.—Johnson, 61, Osborne Rd., Acton. [9811]

**ALLON** (new), 2½h.p., 2-stroke, all models in stock for immediate delivery; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9891]

**ALLON**, 1915, 2-speed, 2-stroke, pan saddle, £39/10 single speed (new), £36; 2-speed, new, £42; 2-speed and hand clutch, new, £45; extended payments or exchange; Alldays Allon, 1915, 2-speed, Dunlop tyres, enamelling and plating good, £30/17/6.—Service Co., 292, High Holborn. [X7651]



## MOTOR CYCLES FOR SALE.

## Antoine.

h.p. Antoine, m.o.v., Bosch, Saxons, perfect order: £12/10.—90, Burton Rd., Lincoln. [X7754]

## Ariel.

RIEL, 3½ h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562]

OLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for Ariel motor cycles. [0797]

RIEL, late 1915, 3½ h.p., countershaft combination, equal to new; £50.—R.C., 104, Victoria Rd., Kiln, N.W.6. [X7802]

14 3½ h.p. 3-speed Countershaft Ariel, with C.B. sidecar, perfect condition, lamps, speedometer; £45.—Parker and Son, St. Ives, Hunts. [9935]

RIEL, 1915, 3-speed, and clutch, 5-6 h.p., spring seat-pillar, Dunlop tyres, hood and screen, Lucas p and Cowey speedometer; £71/15; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7855]

RIEL (new), 3½ h.p., 3-speed countershaft gear, clutch, and kick-starter, decompressor, patent seat pillar; £72; carriage paid to any railway station in Great Britain; extended payments if desired arrears, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9897]

## Arno.

RNO, 3½ h.p., lighting set, in exceptional nice order and condition; £19.—Percy and Co., 337, Euston Rd., London, N.W.1. [9871]

## Auto-Wheels.

UTO-WHEEL, 1913, and cycle; £11/10, or nearest.—9, Elm Place, South Kensington. [9814]

## Bradbury.

RADBURY, 4½ h.p. T.T., winner of several bill-chests; 15 gns.—66, Greyhound Lane, S.W.16. [9828]

RADBURY, 1914, 3-speed gear, 4 h.p.; £25; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7846]

RADBURY, 1912-13, 3-speed, and coach sidecar, £35/10; 3½ h.p., 2-speed, chain drive, £24/10.—or Exchange, Horton St., Halifax. [9758]

16 3½ h.p. Flat Twin Bradbury, 3-speed countershaft, clutch, kick starter, 24/4 Lucas lamp set, distinguishable from new; cost £70, accept £40.—not, 147, White Hart Lane, Barnes. [9808]

## Brough.

ROUGH, 1916 model, 2-speed, splendid condition; 48 gns.—Julians, 84, Broad St., Reading. [9926]

ROUGH, 1915, 3½ h.p., horizontal twin, 2-speed, only run 500 miles, like new, Lucas lamps, last line; sacrifice, £46.—King, Chemist, Sutton, Surrey, one: 646. [9790]

## B.S.A.

OLMORE Depots 261, Densgate, Manchester, for quickest delivery of B.S.A. [0798]

S.A., 1913, free engine, good condition; £22.—Mile End Palladium, 370, Mile End Rd., E. [9865]

15 4 h.p. B.S.A., 3-speed countershaft, lamps, speedometer; best offers.—Parker and Son, St. Ives, Hunts. [9936]

S.A., 1914, 3½ h.p., single-speed; £33/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7840]

S.A., 1914, 4½ h.p. Model K; £40; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7773]

S.A., 4½ h.p., 1917, nearly new, perfect condition; first reasonable offer secures.—Ward, Bridge 186, Weybridge, Surrey. [9862]

S.A. 1914 Combination, fully equipped, runs perfectly, almost new; 45 gns.—Kington, 225h, Ham-smith Rd., London, W. [9901]

OAL Gas. Any combination equipped.—1913 B.S.A., 2-speed, clutch; 27 gns.—Rider Troward and Co., and 78, High St., Hampstead, (D) [9922]

14 4½ h.p. B.S.A., 3-speed, chain drive, Gloria sidecar, splendid condition; any trial; £42.—H. Cole, Hasland Rd., Hasland, Chesterfield. [X7745]

16 B.S.A., 4½ h.p., 3-speed countershaft, kick starter, clutch, electric lighting set, B.S.A. sidecar, in exceptional nice condition; £65. [9855]

15 B.S.A., 4½ h.p., coachbuilt sidecar, in very nice order and condition; £58. [9879]

16 B.S.A., 4½ h.p., in splendid order and condition, 3 speeds; £56.—Percy and Co., 337, Euston Rd., London, N.W.1. [9879]

S.A., late 1916, 4½ h.p., chain drive, Watsonian coachbuilt sidecar, fully equipped, mechanically perfect; £63.—Lewis, 45, High St., Fleur-de-Lis, Mon. [X7877]

S.A., 1914, countershaft, chain-cum-belt, coach sidecar, tyres as new, splendid mechanical condition, equal as new, speedometer, horn, useful assortment reas, tools, tube; bargain, £50.—O. R. Trodegar, 32, na Place, Euston Rd., N.W. [X7721]



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ACTUALLY IN STOCK.

<b>MATCHLESS, War</b> Model, 8 h.p., Comb., 3-sp., spare wheel .....		£120 0
<b>MATCHLESS, War Model, with</b> special lamps, born. ....		£125 0
<b>NEW HUDSON, V.L.B. Model de</b> Luxe, 4 h.p., 3-sp., de luxe S/c. ....		£84 18
<b>JAMES, 1913, 5-6 h.p., twin. Quite</b> the latest .....		£84 0
<b>HARLEY-DAVIDSON, 1917, mag-</b> neto model, bulbous back H.-D. Sidecar .....		£130 0
<b>ROVER, 1913, 5-6 h.p., twin, Combina-</b> tion, £124 9; or solo .....		£97 10
<b>ROVER, 1917, 3½ h.p., 3-speed counter-</b> shaft, Combination with Sidecar; present price £106/4/6; our price ..		£99 4/6
<b>ARIEL, 1917, 3½ h.p., 3-speed, Com. ....</b>		£93 10
<b>LEVIS, Popular model .....</b>		£32 0
<b>CALTHORPE-J.A.P., 1917, 2½ h.p., 2-sp.</b> Enfield gear .....		£39 16
<b>ALLDAYS ALLON from .....</b>		£37 10
<b>ROYAL RUBY, all models, from ....</b>		£32 10
<b>SECOND-HAND MACHINES.</b>		
<b>ENFIELD, 1917, 3 h.p., speedometer,</b> Lucas lamps, like new, only ridden 400 miles .....		£63 0
<b>ENFIELD (two), 1916, 6 h.p., Combina-</b> tions, Lucas dynamo set, hood and screen; respectively .....		£110 and £105
<b>ENFIELD, 1914, 6 h.p., Combination,</b> with accessories .....		£68 10
<b>ENFIELD, 1916-17, 6 h.p., hood, speedo-</b> meter, 3 Lucas lamps, horn, screen. Indistinguishable from new .....		£118 0
<b>ENFIELD, 1916, 6 h.p., Combination, all</b> accessories, condition A1 .....		£78 10
<b>HARLEY-DAVIDSON (two), 1915, mag.</b> models, with Sidecars .....		£72 10 and £68 10
<b>HARLEY-DAVIDSON, 1915, elec. model,</b> and Sidecar .....		£75 0
<b>HARLEY-DAVIDSON (two models), C</b> bulbous Sidecar with hood and screen, like new .....		£22 10
<b>SINGER, 1913, 4½ h.p., 2-speed counter-</b> shaft, speedometer, lamps, horn, solo ..		£29 10
<b>ARIEL, 1913-16, 3½ h.p., countershaft,</b> Combination, kick start, speedo- meter, lamps, horn .....		£72 10
<b>TORPEDO-PRECISION, 2½ h.p., hand cl.</b>		£12 10
<b>JAMES, 1916, No. 6, Com., silencer,</b> speedometer, lamp, horn, apron ..		£73 0
We have several Second-hand and New SIDECARS from .....		£6 10
<b>PUSH CYCLE DEPT.</b> —We have still an excellent assortment of Ladies' and Gents' Cycles in best makes. Ask for Lists.		
<b>WANTED.</b> —FORD VAN, not earlier than 1916; also AUTO-WHEELS.		

STOLEN POST.—Will those who wrote us between Friday, Oct. 12th, and Monday, Oct. 22nd, and who have not yet received a reply, write us again, as our Walthamstow post bag has been tampered with by letter thieves.

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LEADER IN BARGAINS

## MOTOR CYCLES FOR SALE.

## B.S.A.

B.S.A. and Sidecar, 1917 4½ h.p. Model K, lamps, horn, wind screen; £75; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7774]

B.S.A., late 1916, 4½ h.p., 3 speeds, chain-cum-belt, and coachbuilt sidecar, lamps, and accessories, only used one month; £62.—Tilley, Cycle Engineers, Weymouth. [9835]

MODEL H. B.S.A., new June, 1917, Empire light coachbuilt sidecar, 3 lamps, horn, Cowey speedometer, mileage 1,300, carefully used; £75.—25, Church St., Tenbury Wells, Worcs. [9738]

1916 B.S.A., 4½ h.p., 3-speed, chain driven, Millford siderar, all accessories, including speedometer, splendid condition, carefully used, 3,500 mileage; £70.—Salvesen, 8, Maybank Villas, Corstorphine, Edinburgh. [X7686]

FOR Sale, B.S.A. 1915 Model H Combination, in perfect condition, very little used; any trial; new Palmer cord, Lucas best lamps, Watford speedometer, Roby muffs, new chains, Lucas horn; seen any time by appointment. £14/13 worth spare parts and accessories; £75 lot.—Levell's Dining Rooms, 468, Harrow Rd., W.9. [9810]

## Calthorpe.

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

CALTHORPE, 1917 models in stock, 2 and 4-strokes; full particulars upon application.—Walsall Garage, Walsall. [X7709]

1916 2-stroke Calthorpe, 2-speed, perfect, accessories, as new; only £30.—Parker and Son, St. Ives, Hunts. [9937]

COAL Gas. Any combination equipped.—1916 Calthorpe 2-stroke, 2-speed; 25 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead, (D) [9930]

CALTHORPE, 1915, 2½ h.p., 2-stroke, 2 speeds, lamps and horn; £27; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7769]

CALTHORPE-J.A.P., 1917, 2½ h.p., Enfield 2-speed gear, with lamps, insurance policy, and accessories, only done 500 miles; sacrifice £35, or nearest.—George, Westerley, Clevedon. [9675]

1915 Calthorpe-Jap, 2½ h.p., Enfield 2-speed gear, in first-rate order, has done very small mileage, not used since end of 1915, owner on active service, Lucas lamp front and rear, horn, tools, etc.; £25; seen any time by appointment.—Major Markham, The Garth, Dallington, Northampton. [X7699]

## Campion.

CAMPION, 1915, Precision engine, 2½ h.p., 2-speed gear, free engine, runs well on paraffin; £20, no offers.—Write, F. Channell, jun., 5, Golders Green Rd., London. [9743]

1917 Campion, 8 h.p. J.A.P. engine, Jardine 4-speed gear box, kick-starter and clutch, speedometer, coachbuilt sidecar, indistinguishable from new; £85.—Percy and Co., 337, Euston Rd., London, N.W.1. [9882]

## Chater-Lea-Jap.

CHATER-LEA-J.A.P. 8-10 h.p. Combination, 3-speed countershaft, and fitted with Winkworth's Perfection paraffin vaporiser, with Gloria coachbuilt sidecar; only £40.—Winkworth, 15, Jupiter Rd., Ipswich. [X7528]

## Clyno.

CLYNO 6 h.p. Twin, 3-speed, fully equipped; £37, bargain.—65, Tooting Bec Rd., London. [9770]

CLYNO War Office Combinations for early delivery from Colmore Depots, Birmingham and Manchester [0884]

COAL Gas. We can equip any combination from stock.—Clyno, 1912, 5-6 h.p., 2-speed, 22 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead, (D) [9917]

CLYNO 1914 6 h.p. Combination, electric lighting set and horn, disc wheels; £65; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7770]

CLYNO, 1913-14, 5-6 h.p., 3-speed, and sidecar, P. and H. lamp set, Cowey and horn, sidecar complete with spare wheel, £62; 1914-15, 3-speed, 5-6 h.p., and sidecar, £69; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7856]

## Connaught.

1915 Connaught 2-stroke, in very good order; £18.—Percy and Co., 337, Euston Rd., London. [9880]

CONNAUGHT Miniature, single-speed, new, £23/17/6; ditto, 2-speed, £41/6/6; standard 2-speed, £44/9; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7858]

## Coventry Eagle.

COVENTRY Eagle, 2-speed, new; 42 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7857]

1916 Coventry Eagle, Triumph 2 speeds, 2-stroke, free engine, 2½ h.p., in nice condition, run 300 miles only; £36.—Percy and Co., 337, Euston Rd., London, N.W.1. [9881]



## MOTOR CYCLES FOR SALE.

## Diamond.

1916 2-stroke 2½ h.p. Diamond, speedometer, lamp, horn; £20; wants cleaning.—31, Branksome Rd., S.W.19. [9684]

1915 Diamond, 2-stroke, splendid order, fully equipped; bargain, £14.—18, South Bruton Mews, Bond St., W. [9856]

## Douglas.

1915 Douglas, 2½ h.p., 2-speed, almost new; £42.

1915 Douglas, 2-speed, 2½ h.p., in exceptional nice condition; £44.

1915 Douglas, 2½ h.p., 2-speed, in very nice condition; £46.

1911 Douglas, single-speed, in very nice order; £17/10.—Percy and Co., 337, Euston Rd., London, N.W.1. [9883]

I CAN Supply You with a 1917 Douglas.—J. Gourlay, Fallowfield, Manchester. [9858]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, 1913, 2-speed, lamps, horn, etc.; £32.—Sussex Garage Co., Grand Parade, Brighton. [X7671]

DOUGLAS, 1914, 2-speed, magnificent condition; 36 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [0927]

DOUGLAS, 1910, 2½ h.p., lamps and horn; £15.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7765]

DOUGLAS, 1913, 2½ h.p., 2 speeds, lamps, horn, good tyres, etc.; £33/10.—Motor Exchange, Horton St., Halifax. [9759]

DOUGLAS, prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

2½ h.p. T.T. Douglas, as new, lamps, speedometer, horn, etc., absolutely perfect; £40.—Baun, 121, Bond St., Macclesfield. [9800]

1914 Douglas, 2-speed, semi T.T., extra fast, perfect running order, acetylene lamps.—Siderfin, Selworthy, Sidcup. [9746]

DOUGLAS, 2-speed, sound condition and appearance, wants tuning; gift, £16.—1, Bromet Place, Ecclesall, near Bradford. [X6894]

1915 Douglas, 2½ h.p., 3-speed, all black model, £41; also 1915 2-speed T.T. special model, £40.—Ross, 86, High Rd., Lee. [9726]

DOUGLAS, 1913, 2 speeds, new tyres, speedometer, all accessories, run 6,000 miles; £35.—Burcham, 6, Stonegate, Spalding. [X7752]

DOUGLAS, late 1913, perfect condition, 2½ h.p., 2 speed; £27, lowest. 'Phone: East 407.—35, St. Stephen's Rd., Bow. [9741]

COLMORE Depots, Birmingham, Manchester, and Liverpool, and Leicester, for earliest delivery of Douglas motor cycles. [0800]

DOUGLAS, 4 h.p., 2-speed, kick start, C.B. sidecar, perfect; £70.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9545]

DOUGLAS, 1916, 4 h.p., 3-speed, perfect condition, sidecar, all accessories; £70.—Lient. Paine, Port Nelson, Fareham, Hants. [9683]

1915 Douglas, little used, perfect order, T.T., speedometer, lamps, horn, tool kit, patent guard; £43.—Wales, North Walsham. [X7837]

DOUGLAS, late 1913, 2½ h.p., 2-speed, clutch model, fitted with light sidecar, good condition; £31.—Jupp, Bootmaker, Horsmonden. [9816]

2½ h.p. Douglas, late 1914, 2-speed, clutch, kick start, 1 new back tyre, splendid condition; £36.—53, Hordford Rd., Golders Green, N.W.3. [9677]

1914 T.T. Douglas, 2½ h.p., 2-speed, and accessories, in good condition; £32; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [9861]

COAL Gas. Any combination equipped.—1913 T.T. Douglas, 2-speed, 29 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [9925]

DOUGLAS, 1912, single-speed countershaft, £25; 1913 2-speed, £35/10; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7841]

DOUGLAS, 1914, 2½ h.p., in good working order; price, including accessories, £36; can be seen by appointment.—Owner, 34, Great Elms Rd., Bromley, Kent. [9705]

DOUGLAS, late 1913, 2½ h.p., very little used, excellent condition, also cycle shed in detachable sections; what offers?—Apply, 2, Inkerman Terrace, Kensington. [9681]

1915 2½ h.p. Douglas, 2-speed, touring bars, footboard, Amac, 2 lamp sets, horn, Brooks case, excellent condition; £45.—Robinson's Garage, Green St., Cambridge. [9796]

DOUGLAS, 1914, 2½ h.p., 2-speed, electric light, splendid condition, fully equipped, few spare parts; £35, or near offer.—Morganti, 18, Woods Mews, Park Lane, W.1. [9678]

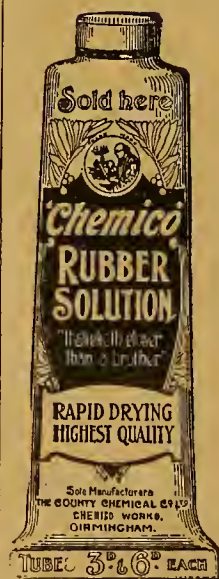
DOUGLAS Motor Cycles.—We can deliver 1917 Model W on receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol (Wholesale and retail). [0923]

It's all very well to evade trouble in the shop by taking the first line that is offered, but what if it means a great deal more trouble out on the road later on?—no use wishing then that you had demanded an article of repute.

Make no mistake about it, you can't pay too much for or insist too firmly upon getting the utmost reliability—in the matter of **REPAIR OUTFITS, RUBBER SOLUTION,** and scores of other good lines fully guaranteed by the name and brand

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## MOTOR CYCLES FOR SALE.

## Douglas.

1914 T.T. Douglas, extra fast one, long large exhaust, knee-grips, lamps, complete, magnificent condition, little used; sacrifice £35. Wanted, Harley combination.—Else, Dimple, Matlock. [X780]

DOUGLAS, 1915½, W.D. Colonial 2½ h.p. model, speed, lamps, etc.; £42; joy riding restriction to reason for sacrifice; write first instance.—McCrinnon, 34, Clarendon Gardens, Maida Vale. [977]

DOUGLAS, 1912, 2½ h.p., 2-speed, clutch, Brook B170, new Lucas lighting set, variable jet B. on B., recently overhauled, splendid condition; £24.—Woodhouse, 33, Reservoir Rd., Brockley. [96]

2½ h.p. Douglas, absolutely new; immediate delivery to models U, V, and W clutch, kick start, again priority permits for doctors, farmers, war and munition workers.—How and where to apply, for full particulars write the Douglas Specialists, Robinson's Garage, Gree St., Cambridge. [979]

## Edmund.

EDMUND, M.A.G., 3¼ h.p. twin, overhead valve spring frame, 2-speed, chain drive, Bosch mag., set spray carburettor, X1 all saddle, new Canoelet side engine recently overhauled; £35.—H. Holmes, 48, Saw cliff Rd., Erith. [973]

EDMUNDS (new), 2½ h.p. J.A.P. Royal Enfield 1 speed, spring frame, double tank, strongly built machine; £54/12/6; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd. London, S.W.1. [989]

## Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3 h.p. Twin; £57/10; and 2½ h.p. 2-stroke £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [083]

ENFIELD, 1916, 3 h.p., lamps, horn, as new; £42.—Sussex Garage Co., Grand Parade, Brighton. [X767]

1916 Enfield Combination, 6 h.p., lightweight model £95.—Terry, 80, Bancroft, Hitchen, Herts. [972]

ENFIELD, 3 h.p. twin, 1916 model, practically equal to new; 40 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [092]

1915 6 h.p. Enfield Combination, electric lamp, numerous spares, absolutely sound; £75.—Farrar, Motorcycles, Hopwood Lane, Hullifax. [966]

1917 6 h.p. Enfield Combination, and accessories, good as new; £85; seen any time.—Bound, Garage, 223, High Rd., Kilburn. [985]

ENFIELD 1917 Combination, 6 h.p., Miller lamp, Stewart speedometer, horn, Palmer tyres, don 1,600; £95.—288, Wightman Rd., Hornsey. [974]

COAL Gas. Any combination equipped.—Enfield 191 6 h.p. combination; 79 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [992]

6 h.p. Enfield Combination, Oct. 1915, hood, screen speedometer, good condition; £65; owner joins colours.—Laughlin, 213, Rye Lane, Peckham. [970]

ENFIELD, late 1915, 2-speed and kick start, chain drive, lamps, horn, spares, perfect condition; £38.—Witcombe, 95, Genesta Rd., Plumstead, S.E.18. [982]

1917 New 3 h.p. Twin Enfield, 2-speed, kick start, complete with horn, mirror, tool kit, used for demonstration only; £38.—24, Tudor Gardens, Barnes. [980]

ROYAL Enfield, 1917, 3 h.p. twin, 2 speeds, lamp, horn, speedometer £50; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X776]

ROYAL Enfield 1916 6 h.p. Combination, P.A. High ring, horn, speedometer; £78; deferred payment accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X776]

1916 Enfield Combination, 6 h.p., Lucas dynamo lighting, hood, screen, mirror, speedometer £105.—Elec and Co., 15-16, Bishopsgate Av., Cannon St., E.C.3. [049]

1916 Enfield 6 h.p. Combination, carefully used, Bink Bosch, speedometer, mirror, mechanical horn, electric lights, electric horn (accumulators), just over 2,000 miles; £86.—H.H., 24, Paulhan St., Burnley. [X774]

ENFIELD 6 h.p. Combination, 1916, in good condition, new heavy Dunlop on back, Palmer for others, new driving chain, spares, and all accessories £78; any evening.—24, St. Stephen's Gardens, Twickenham. [981]

ROYAL Enfield 1916 6 h.p. Combination, Lucas dynamo set and horn, speedometer, clock, 2-seater sidecar, 2 wind screens, horn; £105; deferred payment accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X776]

ENFIELD 6 h.p. 1916 Combination, Palmer cord light car tyres all round, large head lamp, generator rear lamp, luggage carrier to sidecar, very nice condition throughout, and fully equipped; £82/10.—Advertise 156, Gt. Portland St., W.1. [790]

1916-17 6 h.p. Enfield Combination, 12 months' light wear, would convert into excellent tradesman's delivery, no alterations, only different body, which would get purchaser; cost £100, with all lamps and accessories, bargain, £75.—40, Cornwall Rd., Handworth, Birmingham. [X778]



**MOTOR CYCLES FOR SALE.**

**Enfield.**

ENFIELD 1914 Twin 6h.p. Combination, handle start, horn, lamps, 3 new tubes, new outer cover, engine carrier on sidecar, cushioned seat at back of seat, perfect condition; £50, bargain.—Ward, Bridge House, Weybridge, Surrey. [9706]

ENFIELD 1915 Combination, 6h.p., 2-speed, clutch, Thompson-Bennett mag., Amco carburettor, fitted 4 lamps, Stewart speedometer, and horn, £78; (h.p., 2-speed, £20; B.E. or exchange.—Service Co., 22, High Holborn, London. [X7859]

ENFIELD 1916-17 6h.p. Dynamo Combination, hood, screen, speedometer, 105 gns.; also 1916 ditto, 05; also 1916 standard model, sold new May, 1917, 17th hood, screen, speedometer, quite like new, ridden 350 miles, £115; also 1917 3h.p. solo, with 6 g.n. speedometer, Lucas lamps, horn, £63; also 1914 6h.p. combination, condition perfect; also 1916 6h.p. combination, with all accessories, beautiful condition, £78/10. Lamb's, 151, High St., Walthamstow, and 50, High L. Wood Green, N. [9751]

**Excelsior.**

COAL Gas. Any combination equipped.—1914 British Excelsior, big single, 5-6h.p., 2-speed, Montgomery sidecar, 42 gns.; solo, 35 gns.—Rider Troward & Co., 31 and 78, High St., Hampstead. (D) [9924]

AMERICAN Excelsior New Model de Luxe, 7h.p., 3-speed, dynamo electric lighting outfit, head lamp, 1 lamp, electric horn, Stewart speedometer, etc., £85; also Lounge type sidecar to match, £20; delivery free any address; immediate delivery.—The Premier Motor Co., Aston Rd., Birmingham. [9781]

**F.N.**

LIGHTWEIGHT F.N., 1912, good order, Bosch, Amac, good tyres, £10; sidecar, good Palmer e.—Wilde, Willesborough, Ashford, Kent. (D) [9792]

**Harley-Davidson.**

OLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for Harley-Davidsons. [0802]

OFFERS wanted for 1917 Harley-Davidson, hood, screen, speedometer, used.—Bassett, Doncaster. [X7735]

ARLEY-DAVIDSON Combination, 1915, fine order, electric lights and horn, 3 speeds; £65.—241a, Lord, Southport. [X7810]

A. STACEY, 12, Ecclesall Rd., Sheffield, for Harley-Davidsons; P. and H. lamp sets, specially made for H.D., £3/3, carriage paid. [9256]

15 Model J. Harley Davidson, Empress sidecar with screen, in absolutely perfect condition; 7/10.—Stacey, 12, Ecclesall Rd., Sheffield. [9255]

16 Harley-Davidson Combination, electric model, just been overhauled; £89/10.—Elice and Co., 16, Bishopsgate Av., Camomile St., E.C.3. [0552]

ARLEY-COMBINATION, 7-9h.p. (Oct., 1915), lamps, horn, speedometer, condition throughout as new, mileage 1,700; spot cash £70.—Webb, Belmont, Wey. [9771]

15 Harley-Davidson, electric model, with Swan sidecar, screen and hood, beautiful condition; 70.—Mile End Padladium, 370, Mile End Rd., E. Phone: East 1233. [9864]

ARLEY-DAVIDSON, 1915% electric model, Model de Luxe sidecar, just been thoroughly overhauled Milwaukee expert, in new condition; £70, or near ter.—Wright, 27, St. John's Rd., Putney. [9745]

ARLEY 1915 Combination, 7-9h.p., 3-speed, clutch, and kick-starter, electrically equipped, Schebler carburettor, Stewart speedometer, Harley sidecar, 72/10; extended payments or exchange.—Service Co., 22, High Holborn, London. [X7848]

17 Harley-Davidson, olive green, magneto model, purchased new in April, ridden under 1,000 miles solo only, this superb machine is in appearance and condition, including tyres, quite as good as new; still over £85.—10, St. John's Crescent, Canton, Cardiff. [X7881]

ARLEY-DAVIDSON, 1917, 7-9h.p., mag. model, with C. bulbous back sidecar, hood, screen, £130; also two 1915 mag. models, £68/10 and £72/10; also 15 electric combination £75; also two models C, with bulbous back sidecar, hood, screen, slightly used, £210; also brand new 1917 Canoelet, brown finish, (antoniun lightweight, £10/18/6; also several others on £6/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9753]

**Hazlewood.**

HAZLEWOOD 1915 Combination, 5-6h.p. J.A.P. engine, 3-speed clutch, and kick starter, Lucas lamps, speedometer, special sidecar; £72/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7860]

HAZLEWOOD, 1916, 5-6h.p. J.A.P. engine, 3-speed, clutch, kick starter, P. and H. lamps, speedometer, ewart warner, spare petrol tank, Burbury sidecar, only ridden 1,000 miles; owner Overseas.—Dorrill, 189, Hey Rd., Oxford. [X7623]

**Henderson.**

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1915 Henderson combination, disc wheels, good order; 79 gns.; can be equipped for coal us. (D) [9913]

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**Hobart.**

1916 Hobart, 2-stroke, 2-speed, complete, as new, 400 miles, fitted 3-way tap, paraffin or petrol, large spare tank, lamps, not used; £27/10.—18, Kimberley Rd., Falmouth. [9730]

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HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882]

3 1/2 h.p. Humber, 2-speed, coach combination; £25; nice condition.—80, Bisham Rd., Southampton. [X7692]

1914 3 1/2 h.p. 3-speed Humber, lamp, etc., £35, cash or easy terms.—R. E. Jones (Oranges), Ltd., Swansea. [0863]

2 1/2 h.p. Humber, 1913 twin, 3-speed, clutch, recently overhauled, splendid condition; £20.—Box L4, 978, c/o The Motor Cycle. [9720]

LIGHTWEIGHT Humber, in good condition, lamps, tools, runs on paraffin; £20, or near offer.—Rayford, Ball Down Farm, near Winchester. [9708]

HUMBER, 1911, 3 1/2 h.p., 2 speeds, clutch, and starter, and sidecar; £30; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7777]

**Indian.**

1914 Indian, 7-9h.p., clutch model; £33; all accessories.—Ross, 86, High Rd., Lee. [9729]

INDIAN and C.B. Sidecar, 5-6h.p.; any trial; £25.—1, Ward's Terrace, Broad Lane, Tottenham. [9769]

BROOKLANDS Indian Combination, late 1913, 5-7 h.p., top hole condition; £36.—Burdett, Itlingborough. [9802]

INDIAN, 1914, 7-9h.p., and sidecar, wire wheels, all accessories, excellent condition.—Christie Bros., St. Andrews. [9109]

INDIAN, 7-9h.p., 1916 Powerplus, T.T., 3 speeds, in new condition; 50 gns.—Percy and Co., 337, Euston Rd., London. [9890]

INDIAN, 1915, 7-9h.p., spring frame, coach combination; £57/10; exchange entertained.—5, Victoria Av., Surbiton. [X7873]

INDIAN, late 1915, 5h.p., 3-speed, kick start, lamps, horn, coachbuilt sidecar, perfect; £49.—Cozens, 15, Langdon Rd., Rochester. [9824]

1915 Indian, 5h.p., 3-speed, only run 500 miles, like new, speedometer; 50 gns.—Percy and Co., 337, Euston Rd., London, N.W.1. [9872]

INDIAN Combination, 1914%, electrically equipped, beautiful outfit, splendid condition throughout; £52/10.—5, The Parade, Belmont, Surrey. [9772]

INDIAN, 1914-15, 7-9h.p., coach combination, excellent condition, mechanically perfect, auxiliary tank; £50.—Southgate, Lymington, near Folkestone. [9694]

INDIAN Combination, 7-9h.p., 1915, 4,500 miles, 3-speed, electric equipment, kick starter, Milford; £65, or near offer.—Alford, York Av., East Cowes. [9784]

INDIAN, 1915, 5-6h.p., 3-speed, clutch, kick starter, Stewart speedometer, Lucas lamp and horn, all in good condition; £45.—Stephenson, Durham Rd., Stockton-on-Tees. [X7811]

GIFT, 3 1/2 h.p. Indian, clutch model, good tyres, just re-enamelled red and overhauled; must sell immediately; first for £18 secures.—P. Webster, Warwick Rd., Kenilworth. [X7782]

INDIAN, 1915, 5-6h.p., 3-speed, clutch, and kick-starter, T.T. model, Brooks pan saddle; £45; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7849]

INDIAN, 1914, 7-9h.p., 2 speeds, spring frame combination, speedometer, and accessories, in good condition; £50, or near offer.—Neal, Saddler, High Rd., Hayes End, Hayes, Middlesex. [X7746]

INDIAN 7-9h.p. Powerplus, late 1916, T.T. adjustable bars, hand and foot clutch, condition as new, over 70 m.p.g., watch, speedometer, everything complete; £70.—Box L4, 979, c/o The Motor Cycle. [9721]

POWERPLUS 1916 7-9h.p. Indian Combination, 3-speed, hand controlled clutch, electrically equipped, horn, speedometer, plenty of spares; any trial with pleasure; a gift, £78.—Advertiser, 14, Kersal Rd., Prestwich, Manchester. [X7806]

NO Room for late 1915 7-9h.p. T.T. spring frame Indian, 3-speed, kick starter, free engine, clutch, torpedo sidecar, and accessories, all like new; exchange for Douglas, or other good lightweight and cash, or sell 60 gns.—Box 1,386, c/o The Motor Cycle. [X7700]

INDIAN, 1915%, 5-6h.p., 3-speed, unscratched, Stewart speedometer, not used for first 12 months, week-ends since, new Dunlop cover and tube; £45, or exchange with Powerplus model with cash difference.—7, St. George's Rd., Kingston Hill, Surrey. [9839]

INDIAN Powerplus 1916 7-9h.p. 3-speed Combination, 73 gns., rare bargain, actually in stock; condition perfect, lamps, horn, speedometer; also late 1915 7-9h.p. clutch model, plating and enamelling perfect, £55.—Lamb's, 151, High St., Walthamstow, and 50 High Rd., Wood Green, N. [9752]

COAL Gas. Any combination equipped.—1916 Powerplus Indian combination, 79 gns.; 1915 7-9h.p. 3-speed Indian combination, 56 gns.; 1915 T.T. 7-9h.p. clutch Indian, 37 gns.; 1916 Indian 2-stroke, 3-speed, clutch, kick-start, 36 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [9926]



## MOTOR CYCLES FOR SALE.

## Indian.

**INDIAN**, 7-9 h.p., spring frame, 2-speed, clutch, combination late 1913, low mileage, lamps, speedometer, Mechorn, mirror, good tyres, rear new, 1914 Indian C.B. sidecar, new hood, screen, smart turnout, excellent condition; £48, or exchange Morgan, cash adjustment.—Robins, 4, Churchways Crescent, Horfield, Bristol. [9427]

## Ivy.

**IVY**, 2½ h.p., 2-stroke, single speed, excellent condition throughout; £25/5; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7861]

## Invicta.

**INVICTA** (new), 3½ h.p., Abingdon King Dick engine, Sturmer-Archer 3-speed countershaft gear, clutch and kick starter, Dunlop tyres, Brampton forks, a very fine machine; £65/2; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [9899]

## James.

**COLMORE** Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803]

**1917** Model 2-stroke 2-speed James, as new; £36, or near offer.—Mayle, Registrars, Chapel-en-le-Frith. [X7734]

**1913** 4½ h.p. James, 3-speed Armstrong, Bosch mag., tyres as new, new head lamp; £30.—139a, Edgware Rd., London, W.2. [9596]

**JAMES** 1916 Combination, done 900 miles; £65. 'Phone: Admiralty 1.—Skinner, Elsie Villa, Lansdown Av., Leigh-on-Sea. [9799]

**JAMES**, 1915-6, 3½ h.p., 3-speed countershaft, chain drive, kick start, in splendid mechanical condition; £55.—Walsall Garage, Walsall. [X7710]

**JAMES**, 1915, 2½ h.p., 2-stroke, 2 speeds; £32; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7759]

**JAMES**, 4½ h.p., 1916, not done 4,000, vapouriser fitted, accessories, suit tradesman; £50; lightweight part.—Saunders, 54, Aschurch Rd., Croydon. [9803]

**JAMES**, 1916, 2½ h.p., 2-stroke, 2 speeds, lamps, and horn; £36; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7760]

**JAMES**, 1917, 2½ h.p., 2-stroke, 2 speeds, lamps, and horn; £40; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7761]

**JAMES**, 1916, 3½ h.p. twin, 3-speed countershaft, clutch, h.b. controls, all accessories, perfect; £47.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9552]

**JAMES** Big Single Coachbuilt Combination, 3-speed, lamps, horn, and spare tyre, new May, 1917, very little used; £70.—Parsons, Jury House, Martley, near Worcester. [X7714]

**JAMES**, 4½ h.p., countershaft 3-speed, kick start, 1914, lamps, horn, and luggage carrier, with Gloria sidecar, unused for 18 months; price £43.—Owner, Curledge House, Fisher St., Paignton. [X7526]

**1915** 4½ h.p. James C.B. Combination, 3 speeds, kick starter, decompressor, oil chain drive, lamps, horn, and lot of new spares, new Dunlops, condition as new, just overhauled; 50 gns., or exchange for 5h.p. Enfield.—Supt., Children's Home, Birlbrough, York. [X7739]

**JAMES** and Sidecar, 1915, 4½ h.p., Lucas dynamo lighting, Stewart speedometer, lamps, etc.; £78; 5-6 h.p. twin, 3-speed, countershaft, 80 gns., new, or complete with James Canelet sidecar, £101/14/9; E.P. or exchange.—Service Co., 292, High Holborn, London. [X7853]

**JAMES**, the latest 1918 5-6 h.p. twin, actually in stock; also 1913 4½ h.p. solo model, £22/10, with accessories; also 1914 No. 6 combination, with special silencer under sidecar, speedometer, lamps, and horn, £73, like new.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9749]

## J.E.S.

**J.E.S.**, mag., Amac, in 3-speed cycle; £8.—Carr, 125, Cavendish St., Barrow-in-Furness. [X7698]

## J.H.

**J.H.**, 2-speed, new; £35/14; extended payments or exchanges.—Service Co., 292, High Holborn, London. [X7862]

**J.H.**, 1917, brand new, 2½ h.p., 2-speed countershaft, 2-stroke; 42 gns.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9550]

## Levis.

**1916** Baby Levis, 2½ h.p., T.T. handle-bars, in very nice condition; £24. [9873]

**1916** Levis, 2-speed, 2-stroke, in real good order; £26.—Percy and Co., 337, Euston Rd., London, N.W.1. [9873]

**1917** Levis 2½ h.p. Popular, equal to new; £28.—Apply, T. Antill, Rothley, Leicester. [9736]

**COLMORE** Depots, Birmingham and Leicester, for delivery of Levis motor cycles from stock. [0804]

**COAL** Gas. Any combination equipped.—1915 Levis de luxe, 2-stroke, 26 gns.; 1916 Levis Popular, 22 gns.—Rider Troward and Co., 31, and 78, High St., Hampstead. (D) [9928]

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**DOUGLAS**, 1915, 4 h.p., 3-speed, kick start, complete with Barbary Sidecar.

**EXCELSIOR**, 1915, 8-10 h.p., dynamo lighting, 3-speed, kick start, complete with sporting Sidecar.

**CLYNO**, 1914, 6 h.p., 3-speed, kick start, interchangeable wheels, special 5-point Sidecar.

## SOLO MOUNTS.

**RUDGE**, 3½ h.p., Lucas head lamp and generator, speedometer, in first-class condition.

**DOUGLAS**, 3½ h.p., 1914, 2-speed, Bosch magneto, P. and H. head lamp and rear light.

**SCOTT**, 1914, 3½ h.p., Lucas head lamp, Stewart speedometer.

**RUDGE**, 3½ h.p., Multi model, Senspray carburettor, C.A.V. magneto.

**ENFIELD**, 2½ h.p., chain drive, Grado gear, finished khaki.

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## MOTOR CYCLES FOR SALE.

## Levis.

**1915** Levis Popular, original tyres, mileage 1,800, condition as new, P. and H. lamp set, horn, in chaicnally perfect; bargain, £23.—Barclay House, Bow Rd., Leyton, E.10. [974]

## Lincoln-Elk.

**LINCOLN-ELK**, 2½ h.p., Grado Multi pulley, excellent condition; £18.—Owen, Leys Mount, Ashbourne. [977]

**1914** 4½ h.p. Lincoln-Elk and sidecar, clutch, 2-speed kick starter; £25.—Palmer, 138, Church Rd., Battersea. [981]

**COAL** Gas. Any combination equipped.—1911 Lincoln-Elk, 3½ h.p., variable gear; 19 gns. Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [992]

**LINCOLN-ELK**, 1912, 3h.p., Bosch mag., adjustable pulley, lamp, horn, toolbag, new back tyre; £21 seen by appointment.—Scrapps, 25, Albion Rd., South Hampstead, London, N.W.6. [977]

## M.A.G.

**COAL** Gas. Any combination equipped.—1915 M.A.G. 3½ h.p. twin, Enfield gear, clutch, kick-start; 4 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [992]

## Martin.

**MARTIN-J.A.P.**, 5-6 h.p., 3-speed Armstrong, very luxurious coachbuilt sidecar, hood, screen, full equipped, speedometer; £50, or exchange lightweight. Bunting's, Musons Av., Harrow. [974]

## Matchless.

**1917** Matchless War Model, spare wheel; £120.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [992]

**MATCHLESS** Motor Cycles from stock at Colborne Depots, Birmingham and Manchester. [081]

**1915** Matchless Combination, dynamo lighting, spare wheel; a bargain, £86.—Ross, 86, High Rd., Leyton. [974]

**MATCHLESS** 5 h.p. Twin, J.A.P., free engine, a very nice order; £28.—Percy and Co., 337, Euston Rd., London, N.W.1. [987]

**MATCHLESS** Combination, 1915, 7-9 h.p., torque sidecar, 3-speed, absolutely in perfect condition, only asking £75.—Ernest Parish, The Grange, Croydon hall. [X73]

**COAL** Gas. We can equip any combination from stock.—Matchless, 1915, 8 h.p., 3-speed combination, 1 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [992]

**COAL** Gas. We can equip any combination.—Matchless, 1913, 8-10 h.p. J.A.P., 90 bore, o.h.v., race machine; 39 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [992]

**1917** Matchless Combination, brand new M.A.G. engine, 4 detachable wheels, Palmer tyres; £121; exchange entertained.—Scans, Dunn, and Jones, Bromley, Kent. Tel.: Bromley 350. [X69]

**MATCHLESS** Model 8B 7 h.p. Combination, M.A. engine, 1914, coachbuilt sidecar, 3 lamps, electric horn, all spares, perfect running order; £75.—Hobbs, 131, York Rd., Bury St. Edmunds. [97]

**1917** Matchless Combination, brand new, 4 detachable wheels, J.A.P. engine, war model, grand outfit; £120; exchange entertained.—Scans, Dunn, and Jones, Bromley, Kent. Tel.: Bromley 350. [X69]

**MATCHLESS** 1917 Combination, 8 h.p., 3-speed clutch, and kick starter, detachable wheels, including spare wheel, new; £120; extended payments or exchange.—Service Co., 292, High Holborn, London. [X78]

**1917** Matchless 8B2 Combination, with spare wheel and tyre, brand new, enamelled standard gnd M.A.G. engine; a splendid opportunity to obtain "a top outfit" at once, £125.—1a, Bloomfield Rd., Plumstead S.E.18. [X73]

**MATCHLESS** Combinations.—We can give immediate delivery of the 1917 W.O. model Matchless; £120; and also the 1917 M.A.G.-Matchless combination, £125.—Elce and Co., 15-16, Bishopsgate, Camomile St., E.C.3. [04]

**MATCHLESS** (two) 1917 8 h.p. J.A.P. Combination, actually here, £120 and £125 respectively, and wheels in both outfits; easy payments, exchanges, Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [97]

**MATCHLESS** Combination, 8 h.p. M.A.G. engine, 1915, hood, wind screen, speedometer, lamps, tool bag and spares, done 3,000 miles, good tyres, also has trader's carrier, interchangeable with pleasure body; a trial; £82.—Amies, Grocer, Cleobury Mortimer, Salop. [X76]

## Minerva.

**31 h.p.** Minerva, mag., spring forks, adjustable pulley; £29.—Millford sidecar, cane body, £3/15.—Wyll Cottage, Brandon, Suffolk. [X77]

## Motosacoche.

**31 h.p.** 1913 Motosacoche, 2-speed, free engine, 19 gns. paraffin; £18.—Euct, Vine House, West Dr., ton, Middlesex. [97]

## New Hudson.

**NEW** Hudson, 1914, 2-stroke, in good condition throughout; £15.—Sussex Garage Co., Grand Parade, Brighton. [X76]



## MOTOR CYCLES FOR SALE.

## New Hudson.

EW Hudson, 1914, 6h.p., 3-speed sidecar combination, very fine condition; £59/10.—Motor Exchange, Eton St., Halifax. [9761]

EW Hudson, 4h.p., late 1914 model, 3-speed, kick start, chain-cum-belt drive, top-hole condition; £34. Valsall Garage, Walsall. [X7711]

EW HUDSON, 2½h.p. J.A.P. engine, 2 new tyres, in very nice running order; £16.—Percy and Co., 7, Euston Rd., London, N.W.1. [9884]

EW Hudson 6h.p. Twin, 3-speed, coach sidecar, all accessories; £60; perfect.—W. and H. Motor Co., 1, 287, Deansgate, Manchester. [9546]

14 New Hudson, 3½h.p., 3 speeds, coachbuilt sporting sidecar, in exceptional nice condition; £35.—Percy and Co., 337, Euston Rd., London. [9891]

EW Hudson 1916 4h.p. Combination, 3-speed countershaft, low mileage, perfect order, accessories; nearest £8a, New Vernou St., Bury, Lancashire. [X7715]

EW Hudson, 1913, 3½h.p., 3-speed, clutch, in good running order; £34/15; exchange or extended payments.—Service Co., 292, High Holborn, London. [X7865]

IDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 New Hudson 3-speed coach combination; 36 gns.; any combination equipped for coach. (D) [9915]

## New Imperial.

FFERS wanted for 1916 2-speed New Imperial-Jap, lamp, horn.—Bassett, Doncaster. [X7736]

EW Imperial, 1917, 2½h.p., 3½h.p., 6h.p. models in stock.—Crow Bros., Guildford. [2563]

RAND NEW 1917 2-speed New Imperial Lightweight; 39 gns.—Motor Exchange, Horton St., Halifax. [9760]

EW IMPERIAL-J.A.P., 2½h.p., latest 1917 model, 2 speeds; £38/10.—Tilley, The Esplanade, Weymouth. [9833]

15 New Imperial-Jap, 2½h.p., 2 speeds; bargain, £15, no offers.—Brickwood, 86, Queen's Rd., Epsom. [9811]

h.p. 1916 New Imperial-Jap, good condition; what offers.—Horrocks, Asheton Rd., Clayton Bridge, Rochester. [9714]

15 New Imperial, 2½h.p. J.A.P. engine, in first-class order; £24.—Percy and Co., 337, Euston Rd., London, N.W.1. [9870]

EW Imperial, 1915, 2½h.p., 2 speeds; £27; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7771]

EW Imperial-Jap, 1916, 2½h.p., 2-speed, kick start, clutch, perfect; £44.—W. and H. Motor Co., Ltd., Deansgate, Manchester. [9551]

EW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, Tavistock Rd., Plymouth. [9839]

EW Imperial, 1916, 2½h.p., 2-speed, T.T. Model, specially tuned, excellent condition; £25.—Lieut. Ir, c/o 418, Romford Rd., Forest Gate, E.7. [9900]

EW IMPERIAL-J.A.P., No. 1, 2-speed gear, new, 39 gns.; No. 2, with clutch and kick-start, new, gns.; exchange or extended payments.—Service Co., 1, High Holborn, London. [X7842]

h.p. New Imperial-Jap, 1916, in excellent condition, a really good, reliable machine, has never let owner down on road, while runs include 182 miles in 7¼ hours.—Lieut. Hill, Highbury, Ropers Lane, Wareham, Dorset. [X7617]

EW Imperial (new), 2½h.p., 2 speeds; £40/10; actually in stock for immediate delivery; carriage to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., S.W.1. [9895]

EW Imperial 8h.p. J.A.P. Overseas War Office Combinations, as described in detail pages 252-3, Sep. h issue of this paper, exceptional machine in every all; immediate delivery from stock; £114/9.—Colt Depot, Distributors, Deansgate, Manchester, and Reushaw St., Liverpool. [9886]

## Norton.

17 Norton, T.T., as new throughout, very fast; sell for £52/10.—Faulks, Butcher, Belmont, Surrey. [9773]

14 T.T. Norton, 3½h.p., Philipson pulley, speedometer, mechanical horn, accessories, excellent condition; £40.—8, Moorland Rd., Leeds. [9711]

ORTON Big Four, 3-speed countershaft, de luxe sidecar, in exceptional nice condition; £70.—Percy and Co., 337, Euston Rd., London, N.W.1. [9875]

ORTON Big Four, latest pattern, 110 m.p.g., fast, like new, Klaxon, lamps, all accessories; £60; sidecar chassis if desired.—L. Kings, Black Moore Lodge, Wmsgrove, Worcestershire. [X7696]

16 3½h.p. Norton and coachbuilt sidecar, 3-speed Sturmer-Archer countershaft, P.H. lamps and generator, horn, Stewart speedometer, tyres good, Henderson with disc wheel, and is in new condition; £65.—Frederick Kirk, Southwell Rd., Rainsworth, Mansfield, Notts. [X7805]

## N.S.U.

S.U. 3½h.p. Twin, 2 speeds, free engine; 14 gns.—56, Greyhound Lane, Streatham. [9829]

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MESSRS. RIDER TROWARD & CO., having been appointed Sole Agents for the Cox Gas Trailer for Motor Cycles, are in a position to give Immediate Delivery, and will be pleased to give all information possible. A trial run on a demonstration machine can be arranged. The Motor Cycle, October 25th, says: "The machine ran satisfactorily and pulled well, and, in fact, one could hardly tell the difference between gas and petrol." Write also for our List of 150 Motor Cycles and Light Cars, including—

B.S.A., 1917, 4½ h.p., 3-speed, coach Sidecar	62 gns.
ENFIELD, 1916, 2½ h.p., 2-stroke	29 gns.
ENFIELD, 1916 (late), coachbuilt Combination	79 gns.
HENDERSON, 1915, Combination, 10 h.p., 4-cyl., disc wheels	79 gns.
INDIAN, 1916, 2-stroke, 3-speed, clutch, kick start	36 gns.
INDIAN, 1915, T.T., 7-9 h.p., clutch	39 gns.
INDIAN, 1915, 7-9 h.p., 3-speed, coach Sidecar	57 gns.
INDIAN, 1916, Powerplus, coachbuilt Combination, 8-10 h.p., 3-speed	82 gns.
M.A.G., 1915, 3½ h.p., twin, 2-speed	47 gns.
MATCHLESS, 1913, T.T., o.h.v., racing machine, 90 bore, 8-10 h.p. J.A.P.	39 gns.
MATCHLESS, 1917, War Model de luxe Combination	117 gns.
MARTIN-J.A.P., 1914, 3½ h.p., T.T., o.h.v.	25 gns.
RUDGE Multi, 1917, olive green finish	48 gns.
RUDGE Multi, 1914, T.T.	32 gns.
RUDGE Multi, 1913, Combination, as new	37 gns.
RUDGE Multi, 1913, T.T., perfect	27 gns.
SCOTT, 1914, 3½ h.p., 2-speed	32 gns.
TRIUMPH, 1916, countershaft model	72 gns.
TRIUMPH, 1914, 4 h.p., 3-speed, coach Sidecar	45 gns.
TRIUMPH, 1914, 4 h.p., 3-speed, solo, perfect	35 gns.
ZENITH-GRADUA, 1917, 8 h.p., T.T., as new, very fast	72 gns.

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## MOTOR CYCLES FOR SALE.

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2½h.p. N.S.U., requires slight repairs; £7, wonderful bargain.—Box 1388, c/o The Motor Cycle. [9715]

3h.p. N.S.U., 2 speeds, free engine, mag., excellent tyres; £12/12.—80, Bispham Rd., Southport. [X7691]

HAVING Acquired the entire stock-in-trade of the N.S.U. Motor Co., Ltd., we can now supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Eagles and Co., Acton Hill Works, Acton, W.3. [X7753]

## O.K.

1916 O.K., 2½h.p. J.A.P. engine, 2-speed, almost new, free engine; £38.

1916 O.K., 2½h.p., 2-stroke, in exceptional nice condition; £25.—Percy and Co., 337, Euston Rd., London, N.W.1. [9876]

O.K. Juniors.—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn. [9010]

O.K. Junior, Mark IV., 2-speed, new, 38 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7843]

## Omega.

1915 Omega, 2½h.p., 2-stroke, in excellent condition; £18.—Percy and Co., 337, Euston Rd., London, N.W.1. [9869]

## P. and M.

6h.p. P. and M. Combination, 50° two engine, P. and M. coachbuilt sidecar, speedometer, etc., fine turn-out; £75.—Farrar's Motories, Hopwood Lane, Halifax. [9037]

1913 P. and M. Sidecar, very good condition, and plenty of power, easy running machine, light set; £25 cash; any trial after November 2nd.—Ramsay, 26, Caddington Rd., Cricklewood, N.W. [X7819]

## Precision.

2½h.p. Precision Lightweight; any trial here; sacrifice £219; called up.—Fairhurst, Kyalene Row, Wigton. [X7808]

PRECISION, 1915, 4h.p. twin, 2 speeds, lamps, and horn; £38; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7779]

## Premier.

PREMIER, 2½h.p., T.T. model, perfect order, and very good condition, fast; bargain, £24.—Below.

PREMIER, 1914, 3½h.p., countershaft 3-speed, P. and H. lamp set, take a sidecar anywhere; £40.—Below.

PREMIER, 1914, 3½h.p., countershaft 3-speed, P. and H. lamp set, rear light, booter, speedometer, complete with coachbuilt sidecar, in perfect order, condition as new; trial; £52.—Premier Repairs Depot, 18, King's Mews, Theobalds Rd., W.C. [9838]

PREMIER, 1913, 3½h.p., countershaft gear, and Pitsau coach sidecar; £37/10.—Motor Exchange, Horton St., Halifax. [9762]

PREMIER, 1913, 3½h.p., 2 speeds, clutch and starter, and sidecar; £38; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7778]

PREMIER, 1915, 3-speed countershaft, new tyres and belt, lamp set, mileage 3,000, guaranteed perfect, splendid condition; £45.—280, Camberwell Rd., S.E.5. [9718]

PREMIER and Coachbuilt Sidecar, 1916, 3½h.p., spare tank; £63/15; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7844]

PREMIER, 1912, 3½h.p. Villiers, free engine hub, adjustable pulley, Bosch mag., runs well on paraffin; nearest £18 gets her.—J.A.C., 535, Wellesley Rd., Methil, Fife. [X7697]

1915 7-9h.p. Premier, 3-speed countershaft, new tyres, Ivy sidecar, wind screen, complete with 3 lamps, spares, etc., little used; cost £105, sacrifice £75.—20a, Castle Gates, Shrewsbury. [X7788]

1914-15 Premier Combination, 3½h.p., 2 speeds, countershaft gear, clutch model, coachbuilt cigar body, electric light, splendid condition; £40.—A. Sennier, 54, Upper Lewes Rd., Brighton. [9734]

PREMIER, 3½h.p., 1912, 3-speed, free engine, Bosch mag., foot clutch, lamp, horn, tools, good running order, take any hill with sidecar and passenger, 60 m.p.g.; £30, or nearest offer.—Taylor, Sandcroft, Chester. [X7744]

CHANCE of a Lifetime.—Premier, 1915, 4h.p., 3-speed countershaft gear, all enclosed, chain drive, clutch, kick start, new Dunlops, etc.; this machine has only done 1,200 miles, and is practically brand new; for spot cash I will accept £38, no offers entertained.—Brown, 11, Higher Albert St., Chesterfield. [X7816]

## Quadrant.

QUADRANT, 4½h.p., 1916, B.S.A. 3-speed countershaft, coach sidecar; £60.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9547]

## Radco.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 Radco 2-stroke, 19 gns.; as new. (D) [9916]



## MOTOR CYCLES FOR SALE.

## Regina.

31 h.p. Regina Twin, just overhauled, Bosch, runs perfectly on paraffin; £23, or offer.—Pall Mall, Broad-sall, Derby. [X7668]

## Rex.

5-6 h.p. Rex, Bosch, Grado, perfect order; nearest £16/10.—90, Burton Rd., Lincoln. [X7754a]

£6/5.—Rex, 3½ h.p., sidecar, accumulator, clutch, going order.—87, New Park Rd., Brixton. [X813]

32 h.p. Sporting Racing Rex, beautiful handling; £23; called up.—Fairhurst, Rylands Row, Wigan. [X7809]

REX 3½ h.p. Engine and Frame, splendid condition, guaranteed; highest bidder.—316, Attercliffe Common, Sheffield. [X9697]

6 h.p. Rex Combination, 2-speed, m.o.v., officer's property; cost £7 overhaul, unused since; £24.—80, Bisham Rd., Southport. [X7693]

REX, 6 h.p., dismantled, 1912 model, all parts for sale; also 3½ h.p. Excelsior, good condition throughout.—Apply, Fox, 31, Wood St., Rugby. [X7675]

4 h.p. Rex and Sidecar, Bosch, B. and B., in good going order, good tyres, cheap at £17/10; 6 ft. 6 in. X1 in. Triumph belt, new, bargain, 9/6; leather jacket, 12/6.—Pater, 46, Amphill Rd., Bedford. [X9840]

## Roc

ROC, 4½ h.p., 2-speed countershaft, dual clutch, Bosch, Harcourt, chain-cum-belt, 1914 engine and gear, perfect; £24/10.—Halkes, Waddington, Lincoln. [X7804]

## Rover.

COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [0883]

ROVER, 1918, new 5-6 h.p. twin model, for immediate delivery.—Christie Bros., St. Andrews. [X9108]

ROVER T.T., equal to new; 55 gns.; 1917 model.—Julians, 84, Broad St., Reading. 'Phone: 1024. [0929]

ROVER, 3½ h.p., o.h. mag., B.B., spring forks, overhauled; £9/10, must sell.—152, Camherwell Grove, Camherwell. [X9841]

ROVER, 1914, 3½ h.p., T.T. Model, with Philipson pulley, very smart condition; £29/10.—Motor Exchange, Horton St., Halifax. [X9764]

1916 Rover Countershaft Model, 3 speeds, kick start, mechanical horn, P.H. lamps, all as new; must sell; owner gone to France; £53.—3, George St., Richmond. [X9830]

ROVER, 3½ h.p., late 1916, 3-speed countershaft, kick starter, head lamp, generator, rear lamp, very nice mount, perfect throughout; £55.—Mebes and Mebes, 156, Gt. Portland St., W.1. [X8538]

1917 3½ h.p. T.T. Rover, electric lamps, leather knee-grips, mechanical horn, Philipson pulley; 60 gns.—Kingston Motor Works, 27 and 29, High St., Kingston-on-Thames. 'Phone: 1863. [X9685]

ROVER, 3½ h.p., 3-speed, clutch, kick starter, mechanical horn, speedometer, T.T. handle-bars; cost nearly 285 two months ago, perfect condition; only 66 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [X930]

ROVER, 3½ h.p. clutch, 3-speed gear, Klaxon, sidecar, enamelled, overhauled, refitted by Rover Co., 1916, tip-top condition, 90 miles per gallon; offers; 8 gallons petrol.—Saxton, 11, Charnemont Rd., East Ham. [X832]

ROVER, 1918, 5-6 h.p., 3-speed combination, £124/10, or solo £97/10; also 1916 ditto, £105; also 1916 standard; 1917 3½ h.p. actually here, our price £99/4/6, present-day price £106/4/6; also brand new 1918 3½ h.p. solo, with lamps, horn, bargain at £68/10; easy payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [X9750]

## Rudge.

1914 3½ h.p. Rudge Multi, perfect; £25; sidecar free.—Collett, 24, Belmont Rd., S. Norwood. [X9699]

RUDGE Multi, 5-6 h.p., very powerful, very fine coach sidecar; £45.—Motor Exchange, Horton St., Halifax. [X9763]

RUDGE Multi, 3½ h.p., 2-speed, sidecar; bargain. £36.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [X9548]

1913 Rudge Multi, 3½ h.p., splendid order, lamps, generator; £25.—Weston, Thorney Manor, Emsworth, Hants. [X7626]

RUDGE, I.O.M., almost new, exceptional fast machine; £50.—Percy and Co., 337, Euston Rd., London, N.W.1. [X9877]

RUDGE, 3½ h.p., 1912, clutch model, £16/10, or with light C.B. sidecar £20; must clear.—Laytons' Garage, Bicester, Oxon. [X7677]

RUDGE Multi, 5-6 h.p., equal to new; sacrifice £29; also coachbuilt sidecar; trial willingly.—Black, 237, Floyer Rd., Small Heath, Birmingham. [X7669]

RUDGE, 1916, 3½ h.p., Multi gear and clutch, lamps and horn; £42; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X772]

RUDGE, 3½ h.p., late model, hand controlled clutch, lamps, accessories, and tools, in good condition; will take £30, or nearest offer.—Flower, 33, King St., Ripon. [X9703]

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## Sun.

COLMORE Depots, Birmingham and Manchester, delivery from stock of all models of Sun motor cycles. [08]

SUN-VILLIERS, 1916, 2-stroke, 2-speed, in first order and condition; £25.—Percy and Co., 3, Euston Rd., London, N.W.1. [X98]

1916 2½ h.p. Sun, 2-stroke, 2-speed countershaft, good condition, not done 1,000 miles; £22.—Crosley, 88, St. James Park Rd., Northampton. [X98]

SUN-VILLIERS, 2-speed, new, £37/16; V.T.S. in speed, new, £30/10; extended payments or change.—Service Co., 292, High Holborn, London. [X786]

1915 Sun V.T.S., 2-speed, Autoclipse lamp, Lu horn, not ridden last 12 months; snip, £16.—Matthewman, 36, Thomas St., Thornton Lodge, Huddersfield. [X77]

## Sunbeam.

SUNBEAM, 3½ h.p., 1916 (black), fully equipped, split condition; £70.—Henderson, 96, Spottiswood St., Edinburgh. [X77]

SUNBEAM, 3½ h.p., late 1914, 3-speed, combination in beautiful condition, good as new; £70.—F. W. 55, Mason St., Wolverhampton. [X77]

SUNBEAM, late 1914, 3-speed countershaft, h.b.c. clutch, all chain drive, 3½ h.p., in good condition; £50.—88, Uxbridge Rd., Haawell, Middlesex. [X97]

WE have two 1916 8 h.p. Sunbeam combinations stock, both in excellent condition and fully equipped.—Elce and Co., 15-16, Bishopsgate Av., Cambridge St., E.C.3. [08]

1917 Sunbeam, 3-speed countershaft, Lucas lighting set, speedometer, coachbuilt sidecar, indistinguishable from new; £110.—Percy and Co., 3, Euston Rd., London, N.W.1. [X98]

SUNBEAM, 2½ h.p., late 1914, 2 speeds, free engine kick start, perfect condition, looks new, lamp horn, piston seals, all accessories; £40, no offers.—H. Philip St., Sandycroft, Chester. [X77]

1916 Sunbeam, 3½ h.p., semi T.T. bars, black and gold, 3-speed hand-controlled clutch, nearly a few miles only, perfect condition, with humps, mechanical horn.—Robinson's Garage, Greco St., Cambridge. [X97]

31 h.p. Late 1916 Sunbeam Combination, has been carefully ridden, chiefly solo, mileage under 2,000 condition almost as new, Lucas best lamps and hot £75, lowest.—Coates, 12, Laburnum Grove, Beeston, Notts. [X77]

SUNBEAM, 2½ h.p., late 1914, with Lucas lamp, Lucas horn, Cowey speedometer, Dunlop tyres, in equipped, beautiful condition, an ideal business motor; £38.—Sheppard, Lyndhurst, Lower Villiers St., Wobhampton. [X77]

31 h.p. and 8 h.p. Sunbeams, latest 1917 model; £2 absolutely new, immediate delivery against priority permits for doctors, farmers, war and munition workers.—How and where to apply, for full particulars write, Robinson's Garage, Green St., Cambridge. [X97]

## Swift.

SWIFT and Coachbuilt Sidecar, 3½ h.p., 1915, 3-speed kickstarter, complete with lamps and hot £49/10; extended payments or exchange.—Serr Co., 292, High Holborn, London. [X78]

1915 Single Swift, 4½ h.p., 3-speed Sturmer-Ard countershaft gear, B. and B. carburettor, dot kick start, Jones 5 g. speedometer, acetylene lamps a generator, mechanical horn, perfect condition; £145; can be seen at Huntingdon.—Apply, Anderson, Queen's Rd., Brighton. [X97]

## T.D.C.

DE LUXE T.D.C., 1916, 2½ h.p., overhauled, perfect; £23.—W. and H. Motor Co., Ltd., 2, Deansgate, Manchester. [X98]

1917 De Luxe Model T.D.C., 2½ h.p., 2-stroke special demonstration machine; first £25 second £4, Gaywood Rd., E.17. [X97]

## Triumph.

1914 Triumphs, 3-speed models, £35, £36, and £40.—Ross, 86, High Rd., Lee. [X97]

TRIUMPH, about 1910, new mag.; bargain, £14; change.—72, Libra Rd., Old Ford. [X98]

31 h.p. Triumph, 1909, clutch, new Dunlop, lamp set nearest £19.—Box 1,385, c/o The Motor Cycle Co., London. [X77]

1913 Triumph, 3½ h.p., 3-speed, in very good order; £33.—Percy and Co., 337, Euston Rd., London, N.W.1. [X98]

TRIUMPH Junior, 1916, 2-speed, perfect condition, Gordon, Darbshire House, Upper Brook St., Manchester. [X97]

31 h.p. Triumph, beautiful condition, complete, guaranteed; called up; £28.—Fairhurst, Rylands Row, Wigan. [X78]

TRIUMPH, 1912, 3½ h.p., free engine, in very good order; £17/10.—Tiley, The Esplanade, W. mouth. [X98]

T.T. Triumph, 1914 engine, just overhauled, Phil son, very fast; £30.—40, Victoria Rd., Barrow-in-Furness. [X76]



## MOTOR CYCLES FOR SALE.

### Triumph.

- h.p. 1914 T.T. 3-speed Triumph, perfect; £35; seen by appointment.—Paterson, 58, Cedars Rd., Hamp-Wick. [9854]
- RIUMPH, 1911, 3½h.p., Philipson pulley, exceptional good condition; £20.—Pollard, Barbourne St., Worcester. [X7525]
- 14 4h.p. Triumph, and coach sidecar, speedometer, etc., perfect; £50; exchange.—T., 85, Revelstoke, Wimbledon Park, S.W. [9892]
- RIUMPH, 1911, 3½h.p., 2 speeds, clutch and starter; £28; deferred payments accepted.—Eastern Garage, Romford Rd., Forest Gate, E.7. [X7775]
- UNIOR Triumph, latest, ridden few miles, accessories; £45, or mutual exchange modern combination.—Davis, 53, Treadgold St., W.11. [9862]
- RIUMPH Combination, late 1914, 3-speed, clutch, just thoroughly overhauled, fine condition; £44.—at Moulds, 39, Greenholm Rd., Eltham. [9836]
- RIUMPH, 1912, clutch hub, Grado gear, good Dunlops, Lucas lamps, excellent condition; £27 cash.—Coomber, 285th Infantry Battalion, Canterbury. [X7625]
- RIUMPH Junior, 1915, 2½h.p., 2-stroke, 2 speeds, lamps, horn, speedometer; £36; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [X7776]
- 11 Triumph, T.T. handle-bars, long exhaust, 2 lamps, complete, and everything in perfect condition; £22; no reasonable offer refused.—Toop, Cater Valley. [9825]
- RIUMPH, 4h.p., 1914, 3-speed, been fitted with new rings and bearings, two heavy new tyres, lin. belt, T.T. model, absolutely perfect; £42.—Lt. O'Hanlon, C. Dartford. [9692]
- RIUMPH, 1912, 3½h.p., clutch, 1916 Philipson pulley, 1916 carburettor, Gloria sidecar, new 5, footrests, belt, tank re-enamelled, excellent order;—Rev. Orpwood, Fyfield, Ongar. [9791]
- 13 Triumph, 3-speed, stored two years, speedometer, lamps, horn, all accessories, perfect condition; owner going abroad; P.O. for appointment.—Sgt. d, 12, Penton Place, Kensington, S.E. [X7800]
- RIUMPH, 1913, free engine, and clutch, enamelling and plating as new, perfect condition, property of in France, not used since August, 1914, all accessories; £25.—24, Observatory Rd., East Sheen, S.W. [9806]
- DR Sale, Triumph 1916 countershaft motor cycle and Gloria cane sidecar, with Lucas head and tail, speedometer, horn, spare belt and valve, perfect condition, little used; £90.—Shortley, 20, Albany Rd., entry. [X7883]
- RIUMPH, 1910, 3½h.p., standard model, free engine, clutch, Bosch mag., completely overhauled, as speedometer, lamps, and horn, new tyres, guaranteed in perfect order; £20.—The Premier Motor Co., on Rd., Birmingham. [9762]
- 14 Triumph, 4h.p., registered March, 1915, with 1917 torpedo sidecar, Sturmer-Archer 3-speed gear, enamel and plating like new, pedal start, spare lamps, mechanical horn, etc.; £48, or near offer. Oltom, Dudley House, Park Rd., Wembley. [9816]
- RIUMPH, T.T., recently re-enamelled and rebushed electric lights and paraffin vapouriser; for sale, or change for 4in. treadle screw-cutting lathe, complete tools, drills, chucks, etc., and cash, and shipping to ditto of lathe.—Wynn, Solihull, Warwickshire. [X7750]
- RIUMPH, 1913, 3-speed, clutch, just been renovated by the Triumph Co., complete with sidecar, very, P. and H. lamp set, and horn; £45/10.—Triumph sidecar, £21; 1912-13, Sturmer F.E. clutch, £1/5; 3½h.p., fitted to run on substitute, enamelled £19; extended payments or exchange.—Service Co., High Holborn, London. [X7867]
- IDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 countershaft Triumph, as new, gns.; 1915 Triumph combination, 3-speed, 52 gns.; 4 ditto, 47 gns.; 1913 ditto, 37 gns.; 1912 Triumph combination, 2-speed, 28 gns.; 1914 Triumph, 3-speed, 36 gns.; 1913 T.T. Triumph, 22 gns.; 1911 stand Triumph, 17 gns.; any combination can be equipped run on coal gas. (D) [9914]
- Tyler. [9815]
- 15 Tyler, 2-speed, 2-stroke, in real good order and condition; £21.—Percy and Co., 337, Euston Rd., London, N.W.1. [9886]
- Vindec. [9889]
- INDEC Special, 5h.p. twin, N.S.U. 2 speeds, in real good running order and condition; £17.—Percy and Co., 337, Euston Rd., London, N.W.1. [9889]
- Yale. [9876]
- 14 Yale Combination, 7-9h.p., with Phoenix 2-seater sidecar (cost £19/10), m.o.v., automatic lubrication, excellent tyres, 28x3, speedometer, mechanical horn, luggage grid, 2-speed gear, spare set valves, etc.; smart turnout, only done 5,600 miles; owing petrol restrictions will sacrifice for 46 gns.; absolute gift; any bid here.—Buckley, 122, High St., Wealdstone. [9676]
- Zenith. [9687]
- 14 4h.p. Zenith, Grado gear motor cycle, and accessories, in good condition; £24.—Baldwin, 105, Eple Rd., Barking. [9687]

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LADY'S Model Metro, 2-speed, new; £36/10; extended payments or exchange.—Service Co., 292, High Holborn, London. [X7871]

### Miscellaneous.

- BOOTH'S Motorcycles, Portland Place, Halifax.—Detailed list of motor cycle bargains free.
- HARLEY-DAVIDSON, 7-9h.p., fitted with grey coachbuilt sidecar; £69/10.—Booths Motorcycles.
- TRIUMPH, 1910, free engine, T.T. bars, good tyres; £18/10.—Booths Motorcycles, Halifax.
- BRADBURY, 4h.p., 1911, Grado gear, coach sidecar, with screen; £25/15.—Booths Motorcycles.
- TRIUMPH, 1911, free engine model, in nice condition; £21/15.—Booths Motorcycles, Halifax.
- REX, 6h.p., 1909, mag., spring forks, good tyres; £13/15.—Booths Motorcycles, Halifax.
- REX, 6h.p., 1911, m.o.v., N.S.U. 2-speed; £18/15.—Booths Motorcycles, Halifax.
- SINGER, 3½h.p., 1913, 3 speeds, £12/12 coach sidecar; £31/10.—Booths Motorcycles, Halifax.
- PREMIER, 3½h.p., 1911, 3-speed gear, Bosch mag.; £21/10.—Booths Motorcycles, Halifax.
- RUDGE Multi, 3½h.p., 1914, T.T. model, enamelled red; £29/15.—Booths Motorcycles, Halifax.
- SPECIAL Bargain.—3½h.p. Triumph, 1910, free engine model; £16/10.—Booths Motorcycles, Halifax.
- ZENITH, 5h.p., 1914, Zenith gear, nice coach sidecar; £46/15.—Booths Motorcycles, Halifax.
- CALTHORPE-J.A.P., 2½h.p., 1915, Enfield 2-speed, £25/15; O.K. 2½h.p., 1914, 2-speed, £20.—Booths Motorcycles, Halifax.
- RUDGE Multi, 3½h.p., 1913, with Millford sidecar, £29/15; S.P.K., 3½h.p., countershaft 3-speed, chain drive, coach sidecar, £19/15; A.C. Soeable, 1911, £23/15.—Booths Motorcycles, Halifax. [9457]
- MOTOE Cycle, 3½h.p. engine, Bosch mag., carburettor, belt, tyres, all in splendid condition; £15.—Jenkins, 10, Lonsdale Rd., Wolverhampton. [X7755]

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- WANDSWORTH.—1917 Radoe, 2½h.p., mag., 2 speeds, ridden few miles; 29 gns.; exchanges.
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- WANDSWORTH.—1915 Zenith-Gradua, 5h.p., mag., countershaft, kick, beauty; 50 gns.; exchanges.
- WANDSWORTH.—1915 Rover coachbuilt combination, 4h.p., mag., 3 speeds, complete; 42 gns.; exchanges.
- WANDSWORTH.—Lea-Francis coachbuilt combination, 5h.p. twin, mag., 3 speeds; 57 gns.; exchanges.
- WANDSWORTH.—1915 Premier, 3½-4h.p., mag., 3 speeds, clutch, kick, lamps; 35 gns.; exchanges.
- WANDSWORTH.—1915 New Hudson, 2½h.p., mag., lamps, very smart machine; 23 gns.; exchanges.
- WANDSWORTH.—1916 Levis, 2½h.p., mag., lamps, very nice condition; 22 gns.; exchanges.
- WANDSWORTH.—Star, about 1914, 4½h.p., mag., 3 speeds, countershaft, lamps; 28 gns.; exchanges.
- WANDSWORTH.—N.S.U., 1914 4h.p. twin, mag., 2 speeds, runs well; £19/19; exchanges.
- WANDSWORTH.—Blumfield 5-6h.p. twin, mag., new Dunlops, newly enamelled red; £23/10; exchanges.
- WANDSWORTH.—Triumph, 1912, 3½-4h.p., mag., nearly new tyres; very cheap, £18/18; exchanges.
- WANDSWORTH.—A.S.L., 1914, 4½h.p. Precision, Bosch, 2 speeds, runs splendidly; £22/10; exchanges.
- WANDSWORTH.—Triumph, 2½h.p., mag., good tyres, ready drive away; gift, £8/15; exchanges.
- WANDSWORTH.—Wanted, motor cycles, combinations, and light cars, for spot cash.—Below.
- WANDSWORTH.—Easy terms.—Wandsworth Motor Exchange, Ebury St., Wandsworth (Town Station). Phone: Battersea 327. [9820]
- ENFIELD 1916 Combination, new condition, lamps wind screen, hood, and side curtains, luggage grid, speedometer; £78; ridden under 2,000 miles.—Below.
- TRIUMPH, 1913, and sidecar, coachbuilt torpedo pattern, good condition, nearly new tyres, Bosch mag., lamps, etc.; £35.—76, Lordship Lane, E. Dulwich, S.E. [9782]
- 1917 Belt-cum-chain, new July, unscratched, new lamps and horn, semi-T.T., all-black model several spares; £54; 6 gallons petrol free.—190, Divinity Rd., Oxford. [9831]
- BARGAINS.—1915 Wolf 2-stroke, single-speed, £16/10; 1913-14 3-speed 4h.p. Triumph, £36; 1914 7-9h.p. Indian combination, 2-speed, kick-starter, £38; 1913 Scott combination, ditto, £40; cash bargains, no exchanges.—Please call, Douglas S. Cox, The A.S.M.M., 6c, Lansdowne Hill, West Norwood. (See Cars.) [9323]
- HEBDEEN'S Can Deliver from stock 1917 2½h.p. and 3h.p. Enfields; 1917 2½h.p. 2-speed Imperial-Jap's, ladies' or gent's models; 1917 2½h.p. Royal Ruby, J.A.P., engine, 2-speed; 1917 latest W.D. type 8h.p. Imperial-Jap 3-speed combination, 28x3 wheels, all chain drive, price 109 gns.; 1916 4h.p. Triumph, T.T., in perfect order and condition, £35; 1915 2½h.p. 2-speed Enfield, 2-stroke, as new, £20; 1915 5h.p. 3-speed Indian and sidecar, fitted with lamps, speedometer, etc., a beauty, £60; 3½h.p. Victoria-Precision, in new condition, £25, a gift.—Hebden's Motor Mart, St. James's St., Burnley. Tel.: 488. [9757]
- MOTOR TRICYCLES. [9695]
- TRICYCLE and Auto-Wheel; £15, or offers.—Fleetland, Clarence Rd., Fleet, Hants. [9695]
- SIDECAR ATTACHMENTS. [9718]
- COACHBUILT Underslung Sidecar, new tyre and tube, new condition; £8/10.—280, Camberwell Rd. S.E.5. [9718]
- THE Willowbrook Co., Leicester, solicit your enquiries for sidecars of all descriptions. Write for illustrated catalogue. [9718]
- SHOE-SOILED Farlow Sidecars; usual price £10, sale price £7/17/6 each.—Farraw's Motorcycles, Hopwood Lane, Halifax. [9798]
- BEAUTIFUL Premier Coachbuilt Underslung Sidecar, Indian fittings; £12, worth double.—Fairhurst, Rylance Row, Wigan. [X7527]
- TWO Sidecars, one Bradbury coachbuilt, £5; one wicker, cane front, £2/10, in good condition.—Apply, 59, Liddell Gardens, Willesden, N.W. [9691]

All letters relating to advertisements should quote the number at the end of each advertisement, and the date of the issue.



## SIDECAR ATTACHMENTS.

**CORONET** Sidecars.—Illustrated catalogue free upon request.—Booths Motories, Portland Place, Halifax.

**CORONET** Sidecars from £9/15; special model for Harley-Davidson, enamelled French grey.

**CORONET** Sidecars from £9/15; special model for Indians, enamelled red, 28in. tyre.

**CORONET** Sidecars; special coachbuilt model for lightweights, £9/15; illustrated list free.

**CORONET** Sidecars are made to suit any machine, and delivered from stock.

**CORONET** Sidecars.—Send for illustrated catalogue from Booths Motories, Portland Place, Halifax.

**SIDECAR** Wheels, lugs, mudguards, long lengths tubing; state requirements.—Booths Motories, Halifax. [9458]

**BASTONE'S** Sidecars.—New coachbuilt, complete with Michelin tyre, £9/15; also other models at clearance prices.—228, Pentonville Rd., King's Cross, London, N.1. [9903]

**PHENIX** Sidecars, new and second-hand; also several new stock soiled to clear; 100 complete sidecars always in stock; list free.—Phoenix Sidecars, 736, Holloway Rd., London. [X5421]

**SIDECAR** Chassis, complete with springs, new Palmer cord and tie, adjustable any cycle, plating good; 65/-; gold Albert wanted; deposit system.—113, Blair St., Poplar, London. [9787]

**SIDECARS**, touring, sporting, lightweights, fit all makes of motor cycles; hoods, screens, and chassis supplied; few shop-soiled models in stock, bargains; export a speciality.—Burbury Sidecar Works, 389-397, Farm St., Birmingham. [7554]

**SIDECARS**, touring, sporting, and lightweights, fit all makes of motor cycles; hoods, screens, and chassis supplied; few shop-soiled models in stock, bargains; export a speciality.—Burbury Sidecar Works, 389-397, Farm St., Birmingham. [8082]

## SIDE-CARRIERS AND PARCEL-CARS.

**1916** Ford Van, splendid condition; £125.—785, High Rd., Leytonstone. Exchange entertained. [9804]

**1916** Reading-Standard Motor Carrier, twin-cyl. engine, unused, box body; catalogue price £105, cash price £70, or near offer.—Box L4,378, c/o The Motor Cycle. [0891]

## BODIES.

**FARLOW** Coachbuilt Bodies. We can deliver from stock.—Furror's Motories, Halifax. [4482]

**CLEANCE** Lines.—Large stock cane sidecar bodies offered, stock soiled only; low prices.—Willowbrook Co., Leicester. [0901]

**COACH** Bodies, several models; repairs, etc.; trade supplied.—Write, S. Williams, Manufacturer, Collyhurst St., Manchester. [9853]

**BASTONE'S** for Bodies.—New light coachbuilt, £3/10; also other models, underslung, step, and 2-seaters, at clearance prices.—228, Pentonville Rd., King's Cross, London, N.1. [9904]

**PHENIX** Coach, wicker, cane bodies, single and tandem models in all colours; largest selection in the trade; several stock soiled to clear; repairs, repainting, and re-upholstering a speciality; actual manufacturers.—Phoenix Sidecars, 736, Holloway Rd., London. [X5422]

**SIDECAR** Body Designs for the trade only. Working, coloured, pencil, or line drawings of original designs, also working drawings full sized or to scale.—Cooper's Vehicle Journal, Ltd., established designers to the coach trade for over 80 years. Consult us when designing new ideas.—19, Garrick St., London, W.C.2. [0818]

## HOODS, WIND SCREENS, ETC.

**CAMBER** Hoods, 35/- to 42/6.—Bright and Hayles, 73, Church St., Camberwell. [9844]

**CAMBER** Fitted Screen, for fixing on door, 30/-.—Bright and Hayles, Camberwell. [9845]

**CAMBER** Wind Screens, 20/-; screens with side wings, 42/6.—Bright and Hayles, Camberwell. [9846]

**PHENIX** Manufacture Hoods from 35/-, screens 19/6 Immediate deliveries; special list.—Phoenix, 736, Holloway Rd., N. [X5423]

**WIND** Screens, 7 patterns, for sidecars, 19/6, 27/6, 30/-, 32/6, and 45/-; sidecar hoods, 37/6, 40/-, and 52/6.—Juco Showrooms, 248, Bishopsgate, London. [9492]

## ENGINES.

**BRAND** New 3hp. Twin J.A.P. Engines, £10; 4hp. single-cyl., overhead inlet valve, £11.—10, Bloomfield Rd., Plumstead, S.E.18. [X7400]

**3hp.** Standard Range Engine, with mag. pulley (ad- 32 justable), silencer, about 1913, perfect condition; £8/15.—Humphries, 185, Brighton Rd., South Croydon. [X7704]

**WE** have the following engines for sale, cheap: 6-hp. J.A.P., 4-hp. N.S.U., 4-hp. B.S.A. 3-hp. Rex, 3-hp. Zenith, 3-hp. Triumph.—Bedford Works, East Finchley, N.2. [9906]

## GRAND SELECTION.

1917 **NEW IMPERIAL**—J.A.P. . . . 40 Gns

1917 **LEVIS** Popular, 2-stroke £32 0

1917 **LEVIS**, 2½ h.p., 2-speed . . £47 10

1917 **ARIEL**, 3½ h.p., 3-speed . . £80 0

1917 **ZENITH GRADUA**, twin, 3½ h.p. . . . . 70 Gns

1917 **ZENITH GRADUA**, 3½ h.p., twin, kick-starter . . . . 75 Gns

1917 **ROVER T.T.**, Philipson . . £77 10

1917 **ROVER**, 3-sp., c'n'r shaft £80 0

1917 **ROVER**, twin, 5-6 h.p. . . £97 10

1917 **MATCHLESS** and Sidecar £120 0

1917 **B.S.A.**, 4½ h.p., chain-belt 70 Gns

1917 **ENFIELD**, 3 h.p., 2-speed 66 Gns

1917 **ROVER T.T.**, 1 mps & h'm 55 Gns

1917 **ROVER T.T.**, 2 lamps and horn . . . . . 55 Gns

1917 **ROVER**, 3-sp., kick-start, speedometer, lamps . . . 66 Gns

1917 **NEW IMPERIAL**—J.A.P. . . 35 Gns

1916 **ENFIELD**, 3 h.p., 2-speed 40 Gns

1916 **ENFIELD**, 3 h.p., 2-speed 45 Gns

1916 **BROUGH**, 2-speed . . . . 45 Gns

1914 **DOUGLAS**, 2-speed . . . . 34 Gns

1913 **TRIUMPH**, lamp and horn 22 Gns

## JULIANS, 84, Broad St., READING

Biggest Light Car and Motor Cycle Dealers in the South.

46 years' reputation.

'Phone: 1024.

## IGNITION APPLIANCES.

**SIMMS** Single Clock Magneto: £2/15.—Gillespie, Ship-ton, Bellingham, Hants. (D) [X7879]

**MAGNETO**, Simms, 4-cyl., double magneto, almost new; what offers?—Box L4,982, c/o The Motor Cycle. [9866]

**JEHRON**, registered 291,298, greatly superior to platinum, unequalled for blades, screws, etc.; cures misfiring; 4/6 each rivet; Jehron screws, fit Bosch magnetos, 10/- pair; old screws Jehronised, 4/6 each.

**JEKON** Contacts, used by Messrs. Collier Bros., Colver, Martin, making world's records.—Jehron, 38, Herbert Rd., Woolwich, London, S.E. [X4331]

**MAGNETO** Repairs and Spare Parts, all makes, spare parts suitable for Bosch magnetos a speciality.—Simms Motor Units, Ltd., Percy Buildings, Gressa St., Rathbone Place, London, W. T.A.: Simeonit, London. [0746]

**MAGNETOS**—Boulton magnetos, 2½h.p. 65/-, 3½ h.p. 75/- each, from stock, either rotation, variable ignition, Bosch type; guaranteed 2 years; 4-cyl. car magnetos, £7/10.—Boulton and Son, Magneto Makers, Old Hall St., Wolverhampton. [X7041]

**MAGNETOS** Repaired by skilful workmen, expedition and moderate charges; several 1, 2, 4, and V-shaped magnetos in stock; every magneto guaranteed.—The Magneto Mart and Repairing Co., 142, Weymouth St., W. 'Phone: Gerrard 727. [6232]

**C.A.V.**, new, anti-clock, £3/15; Bosch, £4/10; M.L., 24; Renhardt, second-hand, £3/5; Dixie, clock-wise, £2; Bosch, clock-wise, £2/10; Thomson-Bennett, 180°, clock-wise, new, £4/10; one 50°, clock-wise, £4; U.H. clock-wise, second-hand, heavy weight, £4/10.—Firth, Woodbridge Rd., Moseley, Birmingham. [X7499]

**MAGNETO** Repairs of every description. We are late from the Bosch works, and give some guarantee at lowest possible prices. We have a large stock of new and second-hand single and twin-cyl. magnetos in stock, also spare parts. Magnetos taken in exchange, or part payment.—The Magneto Repairing and Winding Co., 158, Seymour St., Euston, London, N.W.1. 'Phone: Museum 1153. T.A.: Kunguacoe, Norwest, London. [8059]

## BELTS.

**BELTS**, best known rubber, two-pieces, fastener free, post paid on approval against cash at half usual price; new 1917 stock; lin. 1, 1 foot, ¾ in. 10d., and ¾ in. 9d.; 6ft. 6 in. ¾ in., to suit Douglas, one-piece, 6/6; one-piece 1 in. belts, to suit all countershaft models, at 8/6.—A. L. Pette, Redditch. Tel.: 91. [X3351]

## RUNABOUTS AND CYCLE CARS.

**HUMBERETTE**, water-cooled, 2-seater, 1914, in condition; £90.—785, High Rd., Leytonstone. [9804]

**MORGANS**.—For good second-hand car or write to more Depot, 49, John Bright St., Birmingham. [977]

**CYCLE** Car Chassis, 6hp. engine, friction drive, was building up; £15.—Corinth, 10, Stoney Lane, Sparbrook, Birmingham. [X761]

**BABY** Peugeot, overhauled, fine condition and appearance, dark red colour; £45.—Colmore Depot, 4 John Bright St., Birmingham. [977]

**MORGAN**, Grand Prix, 1917 model, 5 lamp mechanical horn, speedometer, hood, screen, 10 wheels, spares; immediate delivery; £145.—Parker Bradshawgate, Bolton. [X788]

## CARS FOR SALE.

**HORSTMANN** Light Car, 1915, 4-cyl., seat state smart 2-seater and dickey, detachable wheels, hood, screen, lamps; £115.—75, Christchurch St., Ipswich. [X787]

**12** h.p. 2-seater 1911 Sizaire-Naudin, in excellent condition, Bosch mag., 2-cyl. carburettor, hood, screen, lamps, tools, etc., about 45 m.p.h., and 30 m.p.g.; £65; might accept combination part exchange.—Llewellyn, Highbury, Rogers Lane, Wareham. [X768]

**WE** have the following cars for sale for cash, or tendered payments, or your motor cycle in exchange: Enfield, Studabaker, Alldays, La Licorne, R.M.C. Morris-Oxford, Baby Peugeot, Bayard, Calthorpe, Humberette, Morgan, Carden Monocar, and also a Ford Swift, and Milnes-Daimler van. Full particulars of application.—Service Co., 292, High Holborn, London. [X787]

**CAS!** Not needed to sell my cars, but useful to run them on if you can't get petrol. 10hp. Napier chassis, enclosed valves, gate, £25; 10-12hp. Speedwell 4-seater, £25; 10-12hp. Argyle 3-seater dickey, £35; Cox's gas trailer is the best bargain a £35; 1913 Scott combination, £40; 1914 Indian ditto, £40; 8-10hp. Cheard-Walker sporting 2-seater, £45; 20-28hp. Darracq 1-ton van, £50; 15hp. Talbot cabriolet, £50; De Dion 15-cwt. van, solid £60; 16hp. 15-cwt. Bell platform lorry, fitted for gas trailer, runs splendidly, £65; Planders lorry, monobloc, Rubberline tyres, £65; 12hp. Sizaire-Naudin sporting 2-seater, 4 cyl. monobloc, £75; 20hp. Beetle Humber lorry, Zenith, overhauled, £75; 18hp. Still landaulet, £75; 12hp. Unic van, £75; 10-12hp. 1914 Buckingham motor car, streamline, pointed radiator £85; 14-16hp. Ballot 4-seater torpedo, overhauled, repainted, £85; 16-20hp. Gnome ultra-sporting 2-seater, streamline, fash tail back, outside exhausts, 10 wheels, fast, £85; Straker-Squire 1-ton lorry, £80; Walsley van, £90; Spryker van, £90; 1915 Ford van fitted for gas trailer, excellent condition, £95.—Below

**CAS!** It's not all gas about gas. Get one of my gas trailers and one of the following cars: 1914 Maxwell torpedo 4-seater, overhauled, repainted, price £100; 15hp. Germaine chassis, gate, Zenith £100; Iris lorry, £100; 11hp. 1914 Belsize chassis monobloc, Sankeys, £125; 15hp. American light car racer, actual Brooklands winner, 72 m.p.h., £125; 12-14hp. Unic chassis, monobloc, overhauled, £125; 25-cwt. Mitchell van, solid behind, £125; very special English-bodied Ford 4-seater torpedo, pointed radiator, electric self-starter, C.A.V. lighting set, runs on petrol, paraffin, or gas, £135; 11hp. 1914 Lagonda complete detachable wheels, worm drive, exceptionally smart 40 m.p.g., £135; 30-cwt. Albion-Lacre van, twin solid, £135; 15hp. 1914 Paige torpedo, exceptional condition, £135; 10hp. 1914 Adamson sporting cycle car, 4-cyl. monobloc, gate change gear box, underslung self-starter, £135; 15hp. R.C.H. 4-seater torpedo, overhauled, repainted, £145.—Below.

**CAS!** My guarantee doesn't need it. Repairs free for three months to all cars sold for over £150 (cash only). 10hp. Turner light car, 4-cyl. monobloc, enclosed valves, gate, Zenith, detachables, £150; 20hp. T.T. Darracq racer, overhauled valves, detachable wheels, outside exhausts, streamline, 80 m.p.h., £150; 13hp. Vulcan 4-seater torpedo, enclosed valves, worm drive, £150; 15hp. Arrol-Johnston torpedo, enclosed valves, overhauled, £165; 2-ton Berlet chassis, twin solid, £165; 20-25-cwt. Lacre van, twin solid, £165; 10hp. Le Gui 2-seater, dickey, monobloc, enclosed valves, 4-speed, detachables, £165; 18-22hp. 6-cyl. Belsize, detachable wheels, £175; 15hp. 1915 Studabaker torpedo, dynamo lighting, self-starter, overhauled, repainted cream, fitted for gas trailer, £185; 11hp. Belsize 3-seater, dickey, dynamo lighting, detachable wheels, monobloc, £185; 15hp. Cressley chassis, £200; 12hp. Siddeley-Deasy 4-seater torpedo, enclosed valves, worm drive, detachable wheels, overhauled, £235; luxurious houseboat at Tagg's Island, end-of-season bargain, £275; 1916 25hp. Russell-Knight chassis, sleeve valve engine, £350; 1916 15-20hp. 8-cyl. King streamline torpedo dynamo lighting, self-starter, almost new, fitted for gas trailer, £385; magnificent 30hp. 6-cyl. Napier interior-drive saloon, enclosed valves, 6 gn. tax, wide roomy body, streamline dash, revolving seats, frameless windows, exceptional condition, bargain, £450.—Below.

**CAS!** Any of the above cars to run on house gas with Cox's gas trailer £35 extra. Those fitted can be tried on gas any time. Huge success. Get one for your car. Pamphlet free.—Below.

**DOUGLAS** S. COX, the absolutely straight motor man, 6c, Lansdowne Hill, West Norwood, S.E.27, has all the above cars actually in stock; offers or exchanges invited. Please call. Established 1902. [9322]



# THE MOTORCYCLE

ESTABLISHED IN 1903

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## A Plea for Munition Workers.

WE print this week an appeal on behalf of the munition worker in our Correspondence columns. The munitioneer works very hard and for long hours amidst the noise and racket of machinery, amidst the heat and stifling air of the foundries, or amidst the unhealthy smells of dangerous chemicals. When his work is finished and his scanty hour of leisure arrives, what would be better than a run into the country, as far as his fuel allowance will permit, accompanied by his wife and children—a picnic by the roadside and a few hours spent in inhaling the pure air of wood or hillside?

Let us just glance at the other side of the picture. The worker, after seven full days followed by six nights' work, is not in the mood for hard walking, and in many munition areas several miles must be covered before the country is reached. Even pedal cycling does not appeal to him, and the best then that remains is to spend his leisure at home, probably in a crowded area, where the chief attractions are most likely to be alcohol and tobacco.

We think we have now said enough to show that in some cases a certain amount of motor cycling is desirable, even though it cannot be said to be undertaken with the object of carrying out work of national importance.

The case of the man who is so situated that his only way, or even his best way, of reaching his work is by means of his motor cycle is so plain that it needs no demonstration, provided that his work is worth doing. Clearly, therefore, no obstacle should be put in his way if it can possibly be helped. That a man should be refused petrol for his motor cycle and at the same time allowed, if his funds permit, to take a taxi, is obviously absurd. No petrol, or time, or money is saved by such an arrangement. Moreover, on September 20th we published two letters which stated that the supplies of solvent naphtha and benzole were large in

certain places, and yet the use of these fuels was prevented by Government. Cases like these should be made the subject of an inquiry, for we cannot believe that a responsible Government wishes fuel to be so uselessly hoarded.

## The Motor Cycle as a Means to Education.

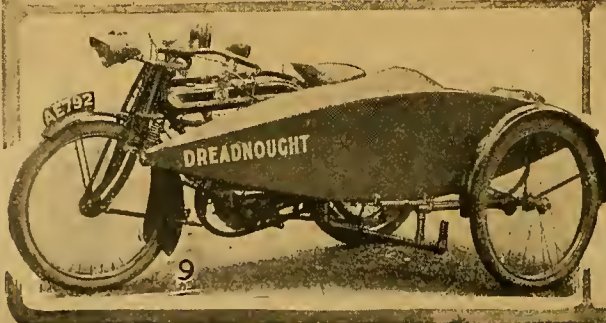
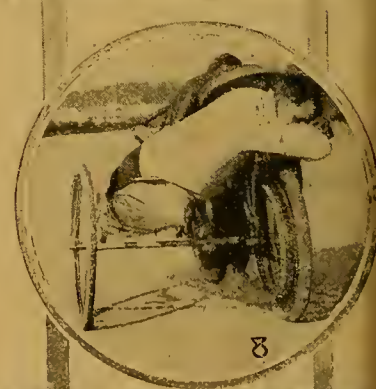
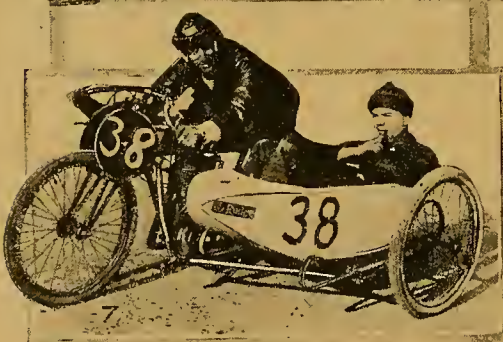
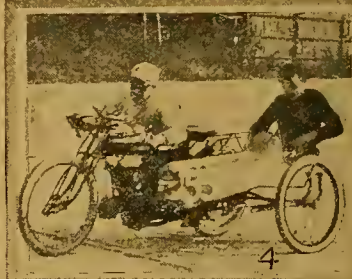
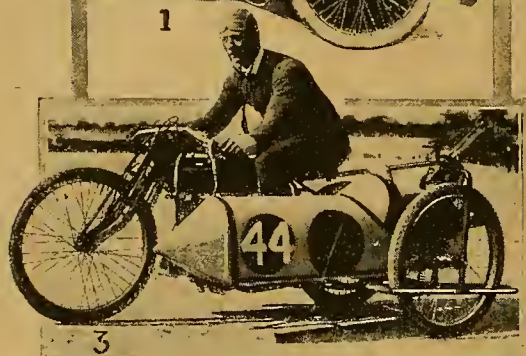
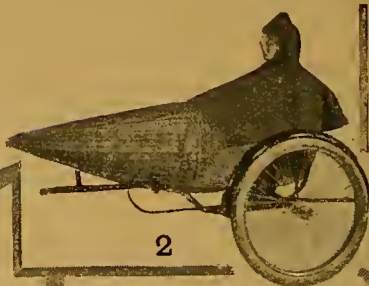
UNDOUBTEDLY the motor cycle has a great educative value, since it develops the mechanical bent that exists in many young men. This aspect of the sport has often been touched upon in these pages, but another point of equal, or almost equal, importance, and one that has not been so frequently considered, is put forward in our contemporary *The Journal of Education* this month. Under "Science Notes" is a paragraph which is well worth quoting.

### PRACTICAL PROBLEMS FOR BOYS.

"Science and mathematical masters could advantageously make greater use of problems presented by internal combustion engines and of the kinematical illustrations afforded by bicycles and aeroplanes. In a single number of *The Motor Cycle*, the issue of October 11th, we noted discussions on the cooling of cylinders, on the energy equivalence of petrol and coal gas, on the capacity of gas cylinders, on the chemistry of petrol, and a particularly instructive essay on relative motion. Every paragraph provided suitable illustrations for classroom use."

It may be taken, then, that it is the duty of the technical press to instruct as well as to interest, to provide sound educative articles as well as reports of current events, accounts of present-day engineering practice and descriptions of new machines. We are, therefore, glad to find our policy approved by so well-known an authority as *The Journal of Education*. It is not always possible to include so many articles of the type to which our contemporary alludes as were published on October 11th, but we hope that such articles will not often be lacking, and that they will prove to be useful in the manner indicated.





SOME curious and amusing results have been attained in endeavours to design sidecars offering and possessing the minimum of weight, and, although the attachments have been called "freaks," there was a purpose in so designing them.

The primary object in building them was to offer the least possible resistance to the wind when competing in hill-climbs and racing.

In No. 1 the designer must have reached the "limit" in building a wind-cutting body. the passenger's comfort being of small account. No. 2 has quite a "Mephistophelean" touch, and incidentally shows how thoroughly one can proof oneself against rain when sidecarring.

A device similar to the Clyno (No. 1) is that which Fred Barnes used with his Zenith on Brooklands some years ago, shown in No. 3.

Another remarkable-looking sidecar is that attached to G. B. Ware's twin (No. 4), and evidently the perpetrators of this attachment possessed the required sense of humour, for they labelled it "The Earwig."

The sidecar J. Woodhouse has attached to the Quadrant (No. 5) is one of his own design, and somewhat reminiscent of a Dutch clog. Nos. 6, 7, 8, and 9 are undisguisedly built with the one idea of lessening wind resistance. No. 10, an Indian attachment, has been called "morbid," and no wonder.

One could enumerate and illustrate scores of suchlike sidecars, but these serve to show the ingenuity of design exhibited in bodies to suit particular fancies and needs.



OCCASIONAL  
COMMENTSBY  
"IXION"

## What we shall get.

**M**OTOR cyclists must be content with two crumbs from the war loaf. We shall undoubtedly get infinitely better cooling, and we shall undoubtedly get more power from a given c.c. The pre-war motor cycle engine seems to be an object of derision amongst my Service friends. Men who are accustomed to be troubled with over-cooling in 10 h.p. air-cooled cylinders can hardly restrain their scorn for  $3\frac{1}{2}$  h.p. air-cooled cylinders, which pre-ignite and get tired, and render their plug electrodes incandescent. The next T.T. race in the Isle of Man should attract some very pretty engines, far too costly to be duplicated on stock machines, and far smaller than those to which the Island is accustomed, for the simple reason that its roads would not hold a modern  $3\frac{1}{2}$  h.p. There should be some extraordinary streaking up the mountain road by very wee machines. But on the broad question, it is folly to hope for a commercial motor cycle which shall have a chassis approximating in weight to the ratios of the Frontenac car, or an engine closely related in weight and power ratios to the best aero types.

## Aero Sparking Plug Practice.

**I**T strikes me that it is rather a waste of time for us to discuss sparking plug matters whilst the tongues of the people who know most about them are tied. If the last three and a half years have not taught the manufacturers of plugs and thousands of users more about them than we ever knew it is a bad job; but the members of the Flying Services cannot yet tell us anything. I think we should be fairly safe in setting out the following points as the basis of our expectations for some interesting information after the war:

1. In the early stages of the war overheated plugs were a great nuisance on aero engines, as most engines ran red hot at the slightest provocation.
2. Rotary engines were prone to oil up their plugs, and consequently the plug makers had to devise a plug which could burn its points clean, without heating them to incandescence.
3. Insulation troubles were largely avoided by using a method of construction which rendered it impossible for the insulator to gape, and materials which would not crack under any conceivable heat stresses or variations of temperature.
4. Now that the cooling of engines is more fully comprehended, overheated electrodes are uncommon in the air.
5. In actual service at the present day, the routine presumably is to scrap plugs after a very brief life, seeing that they cost a trifle compared to the potential loss resulting from their failure in the air; but overheating, rapid sooting-up, and faulty insulators have been, comparatively speaking, eliminated, so that

slow carbonisation is, perhaps, the sole surviving trouble of any real importance.

It does not however follow that the trade will be ready with a *cheap* first-class plug when peace returns; the cost of a plug is a bagatelle when you have to pit against it the safety of two lives, a machine worth £2,000, and whatever values may depend on the reliability of that machine when in flight. However, it should be an easy matter by now to produce expensive plugs which can run for ever, unless faulty carburation and faulty lubrication impair the surfaces of their insulators. Cheaper production of satisfactory articles ought to be the one remaining problem in the plug trade when the war ends.

## Weights and Gear Boxes—A Fallacy.

**A** CORRESPONDENT lightly argues that if you decide to add a 20 lb. gear box to a 140 lb. motor cycle, you will only add 20 lb. to its weight. He makes a very great blunder. Fitting a countershaft gear box subjects a frame to a host of fresh stresses; fitting a hub gear is almost equally destructive. When hub gears were first introduced on a large scale several friends and I got early samples, and began testing them to destruction in the interests of *The Motor Cycle*. We destroyed our frames long before the gears showed serious signs of wear, and though the makers early began to stiffen up their frames, I broke the second and third editions of that year's frame (a famous make) before they at last got it right. Similar experiences followed when the countershaft gear boxes first came in. To quote a rough analogy, my body is rigid enough to resist a straight pull, if one man pulls at my ankles, and another at my neck; but if a Mexican cowboy lassoes me round the waist, and spurs his horse, I shall certainly buckle amidships very perceptibly. So the fitting of a gear box entails rather extensive weight increases. Add to this the fact that chain drive demands a more substantial engine and wheel, even when spring drives and shock absorbers are used; and that chains and sprockets are heavier than belts and pulleys, and the full bearings of the problem come into view. My own feeling on the subject is that the trade has not exploited the real possibilities of the multi-speeded lightweight. Some years ago a leading firm sent me a  $3\frac{1}{2}$  h.p. model fitted with an epicyclic hub; the outfit was admirably suited to a skilled rider, but was not altogether adapted for a fool, and so it never came on to the market, but it weighed appreciably less than the average two-speeded baby two-stroke of to-day, and what many of us feel is that variably geared lightweights may and should scale far less than they ordinarily do. But you cannot transform the Levis Popular into a two-speeder by weighing it, weighing a sample gear box, and adding the two together.





THREE years ago there appeared in *The Motor Cycle* two photographs taken on the occasion of our first attempt to climb the Andes, the high range of mountains running down the west coast of South America. Our intention was to reach the "Cumbre," the highest point of the international highway between Chile and Argentina, and known as the Camino de Uspallata, which starts from Los Andes, a town situated at the base of the mountains on the Chilean side and ends at Mendoza, Argentine. The Cumbre is a very small plain, crossed by the boundary line and situated at an altitude of 13,905 feet above sea level. From here the road descends into Argentine territory. It is on this small plain that the two countries erected a statue of Christ the Redeemer, in commemoration of a peace treaty effected between Chile and Argentina after some border difficulties that nearly led to war, the incident being finally settled by King Edward, to whose arbitration the dispute was submitted.

#### Preliminary Arrangements.

The Cumbre was our goal, and our failure in our first attempt in April, 1914 (we only managed to reach Juncal, at a height of 7,300 feet), served to increase our desire to be the first motor cyclists to climb the Andes. Shortly after the attempt of 1914 the Valparaiso Moto Club was founded, and the writer, acting as secretary, was able to push the idea of making another trial. The months of summer and autumn are the only ones during which the ascent is at all practicable on account of the absence of the snow that covers the mountains in winter and spring, and the corresponding months of 1915 and 1916 passed without our being able to satisfy our wish. But at last a good occasion presented itself. A little talking kindled the enthusiasm of a dozen motor cycling and motoring friends, and the last four days of Holy Week in April last were fixed upon for the attempt.

Six motor cyclists and eight motorists wrote down their names in the respective list, and the last days saw five of the former tuning their engines to a pitch, reducing gears, and doing other things to their machines in preparation for the trial. But the writer could only act as a crestfallen looker-on during those days, as difficulties arose with the Custom House on account of the wrong marking of the crate in which came his new Henderson. However, the day before

the one in which the machines were to be trained to Los Andes a telephone call announced the fact that the bicycle was being carted home. A couple of willing friends helped me to uncrate and fit up the motor cycle—my ninth—and how pretty and formidable it looked! I began to question myself whether I was not going to ruin that four-cylinder motor by attempting that climb—hours of low gear work with a completely new engine with no running in whatever. An injection of petrol into the intake, a dig of the starting pedal, and the engine roared. That sign was enough.

Next day, April 5th, the motor cycles were sent to Los Andes by train, and later on we ourselves were journeying there. The three cars, occupied by the motoring party which was to accompany us, had started for Los Andes early that morning, where we were to meet. On reaching Los Andes we were told that we could not get the motor bicycles out of the station till next morning. This marred our itinerary, as we had decided to make a start early on the 6th; moreover, the differential of one of the cars—the Buick—had to be taken down, as something had jammed on entering the garage.

#### The Start.

At eight o'clock the next day we took the machines from the railway station, and soon after were at the Plaza of the town, surrounded by an admiring crowd, who watched with interest our final preparations prior to the start. The news of our attempt was known in Los Andes days before, and the questions to be answered were indeed never ending.

The motor cyclists of the party were: Ernesto Lopez (7 h.p. Indian) (president of the Valparaiso Moto Club), Carlos Droste (3½ h.p. Motosacoche), Agustin Macchiavello (7 h.p. Indian), Emilio Blot (7 h.p. American Excelsior), Charles Bowdler (2¾ h.p. Humber), and myself with my 7 h.p. Henderson.

The motorists sent to say that they could not start before midday on account of the mishap suffered by the Buick, and added that we could make a start and wait for them at Rio Blanco (kilometre 34).

A little before noon we reached Rio Blanco, where we were to wait for the motor cars. All the machines had worked splendidly. I had some difficulty at first with my Schebler carburetter, but soon learnt its secrets. It was interesting to note that this carburetter, fitted to my machine and to the Excelsior, had



**First Ascent of the Andes by Motor Cycle.—**

to be adjusted constantly as the height increased—a job which, in my case, could be done from the saddle and on the move. An hour and a half elapsed and the cars did not turn up, so, although they carried the provisions—no small detail for us—we decided to push on to Juncal, the intended end of our first day's run.

As soon as we started from Rio Blanco the climb became formidable, and soon the motor cycles were bucking and plunging over the loose stones from one side of the narrow road to the other. The low gears conquered, however, although not infrequently motor

small difficulty in a small sixth order station with practically no accommodation whatever.

Meantime, the motoring party in two Fords and the Buick had started from Los Andes at 1 p.m., and two hours later were in Rio Blanco, where they were told that we had gone on. The stiff climb had its effect on the cars, and they had to stop frequently to replenish the radiators. Water had to be brought in pliable buckets from the river running at the bottom of the deep and narrow valley, the motorists sometimes

MOUNTAIN  
SCENERY  
IN THE  
ANDES.



(1) In the foothills of the Andes. The road on the way to Juncal Station.

(2) A corner of the Inca Lake at a height of 9,700 feet above sea level.

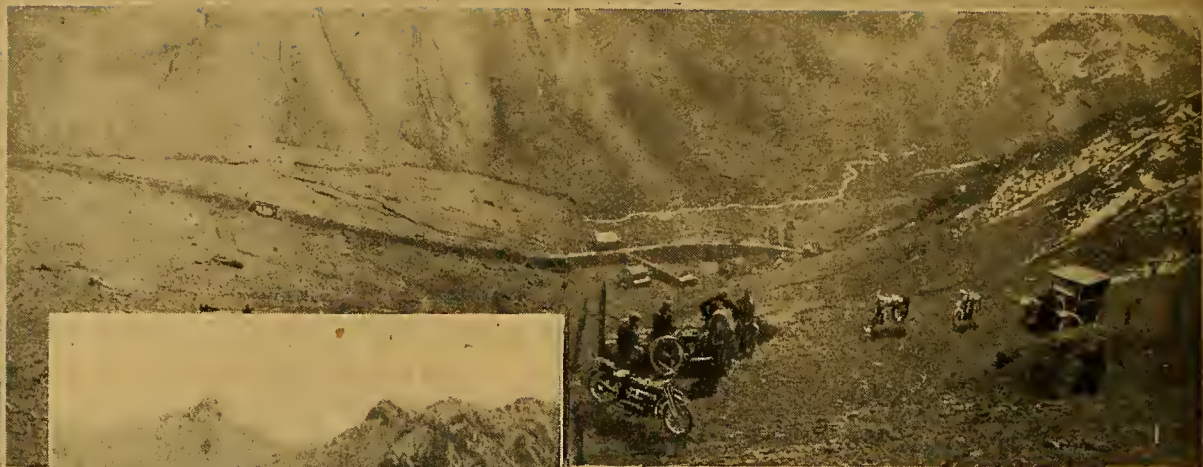
(3) Juncal Station, 7,300 feet above sea level. This is where the first attempt of 1914 came to an end.

having to descend some three or four hundred feet for the liquid. About six o'clock the cars reached Juncal, and soon both parties were having dinner together.

That night—a fine full moon shining at its best in the clear atmosphere of Juncal, 7,300 feet high—we walked up to reconnoitre the first inclines that awaited us next morning: our Waterloo of 1914. Those zigzags, as far as we could distinguish up the hillside, were in number forty at least, with a gradient of nothing less than 1 in 3 in the first stretches, and hairpins by the dozen, all of which contributed to damp the spirits of everyone. Anywhere near the sea level that climb would not have terrified us to such an extent; but here everyone considered the loss of power by the engines, which we had already

cyclists could be seen running for short stretches by the side of their machines. But, however bad, the road was in a better state than it was three years previously, and a little before four o'clock Lopez and myself—by the way, the only two of the party who had taken part in the first attempt—reached Juncal station (kilometres 52). We had taken six hours, including stops, to cover the fifty-two kilometres, which was half the time taken in 1914. At Juncal we were met by the stationmaster, Señor Iturra, who had been so attentive to us before, and he welcomed us warmly, leaving no stone unturned to make us comfortable—no





experienced on account of the height, and we doubted our chances.

#### Difficulties Commence.

It is Saturday morning, the time 8.30, and we are facing that wall up which the road zigzags higher and higher till it is lost to view over the mountain ridge. Can we do it? Everyone has replenished tanks and is now silent. The bark of an Indian attracts our attention; Macchiavello has started his engine some distance away from the group, and a moment afterwards shoots past us and is climbing up to the first hairpin, the roar of exhaust increased a thousand-fold by the echoes of that deep and narrow valley. He is now on the bend and goes round it in fine style; on the second hairpin a huge skid nearly puts an end to his climb, but he corrects himself and goes on. One after the other eight or nine hairpins stand to his credit until he stops to cool his overheated engine. The Indian climbs much more than we expected, and our hopes rise still more as Blot on his Excelsior gets very near to Macchiavello. We now feel sure that the big engines will climb, but how about the two smaller ones and the cars? Bowdler starts and climbs splendidly, although skidding much on account of the bad position of the footrests stuck away in front of the machine so high that it seems an inch or two more will bring his feet on to the handle-bars; the revs are many, and the little Humber overheats quickly, so that the climb must necessarily be made with many stops.

Droste's Motosacoche is geared very low, and there are moments when it pulls well, but the carburetter is a little beast, and at the end of the long zigzag road he is the one that feels those corners most.

Now start the three cars, and slowly but surely they rise higher and higher; very quickly, however, the water in the radiators begins to steam, although in order to assist cooling the engines are uncovered and the hot air intakes taken off.

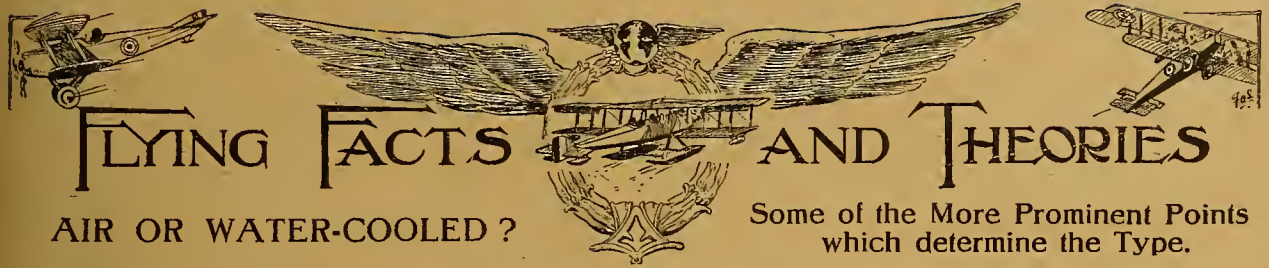
*(To be concluded.)*

(1) Seven kilometres from the Cumbre, looking down towards Caracoles Station. The Transandine railway line can be seen running at the bottom of the valley, and at the right the Chilean entrance to the Andes Tunnel. The road, which ascends in zigzags from the railway bridge, can be distinguished.

(2) A landslide between Caracoles and the Cumbre, which blocked the road for quite a distance.

(3) Near the summit; the Buick makes headway through the snow.





By W. G. ASTON, A.M.I.A.E.

**I**T is obvious that in an aeroplane for war purposes which is likely to come under hostile rifle and gun fire the engine that for its effective operation calls for the least number of liquids is the best, and as the air-cooled engine demands only petrol and oil, whereas the water-cooled motor requires petrol, oil, and water—the loss of any of which must bring the machine to a stop—it would seem that the latter must have but a poor chance compared with the former, especially as radiators, piping, and water itself are decidedly ponderable things, and as they are not actually consumed in flight, must be looked upon as more or less unnecessary dead weight. Yet the water-cooled engine is at the present time decidedly in numerical preponderance over the air-cooled.

These facts are in apparent opposition to one another, and require an explanation.

Great as is the advantage of carrying the minimum weight and number of liquids, other factors of scarcely less importance come into the consideration. First and foremost is the matter of power. Whereas a few years ago the most ambitious designers of aeroplanes scarcely dare look beyond the 100 h.p. mark, to-day single engines giving three times that figure are not only called for, but are actually in common use, and for this reason, that not only has the gross weight of machines gone up in accordance with greater passenger accommodation and weight-carrying requirements—to say nothing of an enhanced factor of safety—but greater and greater speed is expected of them. Both of these desiderata demand greater engine power.

#### Engine Power and Dimensions.

If we had free scope in the matter of aeroplane engine design, that is to say, if one had unrestricted dimensions in which to work, there would be little hesitancy in going out for the air-cooled engine. It is true that with this type it has rarely been found possible, or expedient, to exceed 20 h.p. per cylinder—a figure which merely represents present-day limitations of material, but if necessary this objection could be clearly met by multiplying cylinders indefinitely. Unfortunately, aeroplane conditions do not admit of this simple procedure being carried out. The engine, when made, has got to be installed in the machine; the position of the centre of gravity is a matter of importance; moments of inertia have got to be considered, and other engineering points crop up. Then, for example, a very long engine is bad for the following reasons: It is not easy to cool uniformly without involving cowling of pretty high resistance; it takes up a lot of room and prevents the principal weights—*i.e.*, engine, petrol, pilot, and passenger—from being closely massed together, and it further requires an enormously

stiff and consequently heavy crankshaft if it is to be free from intense vibration periods.

If the alternative of the radial or rotary engine is adopted, another dimension steps in and becomes awkward to deal with, *viz.*, diameter. In the interests of low air resistance it is desirable to keep the body of an aeroplane fairly narrow, and this can obviously not be done if a very wide engine is to be stuck on in front. Here let it be pointed out that it is almost essential for an air-cooled engine to be placed in the immediate wake of the screw. If used on a pusher machine the engine will only be cooled by air travelling at the speed of the aeroplane, which will be considerably less than that of the slip-stream of the screw, consequently if used on a “pusher” machine an air-cooled engine will require a special fan to be installed, thus introducing an increase in weight and complication, and a considerable loss of power. This, perhaps, would be avoidable if an aeroplane were only required to fly level; unfortunately, however, great speed of climb is nowadays an essential quality, and in fast climbing the speed of the aeroplane is reduced as low as possible, whilst the engine is opened up as much as possible, hence you get two sets of conditions which clash very badly.

#### The Advantages of Water Cooling.

Now a water-cooled engine can easily be made to give as much as 50 h.p. per cylinder, and in consequence of this it can be made very compact. This in itself means saving of weight, especially in the reduction of length of the crankshaft and crank chamber, besides being very much more easily installed in an aeroplane body. Not being very wide, it can be quite easily “faired off,” and its small length will allow a very intimate and close grouping of the principal weights in the machine. Further, it need hardly be pointed out that air-cooled cylinders, if similarly arranged, must be placed further apart than water-cooled ones, though in this connection the length of the crankshaft and big end bearings must be allowed to enter the consideration.

Again, in an aeroplane engine which is fairly narrow, height is not a matter of very great consequence. Hence the demand for more power in proportion to the length of the engine can be met by an increase in stroke, whereas in the radial and rotary air-cooled engines this dimension is strictly limited.

For these reasons one need not be surprised to see the twelve-cylinder engine, whether it be air or water-cooled, developed more along the lines of three sets of four cylinders than of two sets of six. In the former type the balance is not quite so good, but the crankshaft is lighter and stiffer, the weight in general



**Flying Facts and Theories.—**

is less, and the whole engine is shorter and more compact.

**The Air Screw an Aid to Air Cooling.**

Since, as I have pointed out above, the air-cooled engine can most usefully be employed in machines in which it is placed immediately behind the air screw, it follows that it will give the best results when permitted to drive the screw direct—that is to say, without the intervention of a reduction gear—and for these reasons: firstly, because it requires a slip-stream of high speed, and, secondly, because the higher the speed of the aeroplane, the higher the efficiency of the screw *ceteris paribus*. A reduction gear (an unavoidably heavy component) will allow a higher speed of revolutions to be attained and maintained, but the larger diameter screw will provide a less forcible draught over the engine. Thus it is that the air-cooled engine, whether radial, rotary, or stationary, is more suitable for the very high speed machine, at all events as things are at present. According as materials improve, so we shall be able safely to get a higher mean effective pressure in the cylinders of the air-cooled engine. The speed of revolutions can consequently be reduced if necessary, and direct driving of a fairly large diameter screw be employed. This will enable the air-cooled engine to do good work on big weight-carrying aeroplanes of which very high speed is not demanded, and will, further, allow it to be made in single units of, comparatively speaking, very high powers.

Of all air-cooled engines the stationary radial has probably the greatest promise for the future and chiefly

for the reason that its cylinders are not exposed to the strain of centrifugal force, and also because silencers and proper exhaust pipes can be used. Indeed, it is probable that the adequate cooling of this type of engine can be made to involve actually less air resistance than is imposed by the radiator and piping of an water-cooled engine of the same power. For the purposes of this argument I assume that the development and improvement of engineering material will continue at a rate at least equal to that of the past few years. If that assumption is justifiable, and I think that it will be generally agreed that it is, then it is fairly safe to predict that within the next few years the water-cooled aeroplane engine, except for certain special purposes, perhaps, will be a "back number."

An important aspect of the same matter, namely, the future of air cooling, relates to the employment of air-cooled engines on cars, and this cannot be without interest to the motor cyclist in view of the fact that he, of all people, has had many years of practical experience. Let it be at once said that even with quite ordinary material the air-cooled car engine is a perfectly practical proposition to-day, but it is not to be supposed that all its particular little disadvantages can be swept away at once. It is probable that for some little time the air-cooled engine will be slightly noisier than the water-cooled, inasmuch as more latitude has to be allowed for expansion, apart from the fact that the fan will necessarily make itself heard. In this connection, it may not be without interest to point out that the chief difficulty to be overcome in attempting to solve the problem of the noiseless aeroplane is not the silencing of the exhaust but the silencing of the air screw.

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REMINISCENCE OF THE TRIAL DAYS OF OLD.



The scene, Dartmeet Bridge, will be recalled by many motor cyclists who are now riding under far more strenuous conditions than the worst periods of any six days' trials, and many must be the reminiscences told in the trenches, and under the burning Eastern sun, of the old days of trials and hill-climbs.



## MILITARY NOTES.

## A NEW MASTER.

**COL. SIR H. C. L. HOLDEN,** K.C.B., who has lately been given the rank of Hon. Brigadier-General, has been elected Master of the Gun-makers' Company.

□ □ □

## ARMY ARTIFICERS.

**THE** Royal Flying Corps, the Royal Artillery, and other technical corps of the Army are still in urgent need of artificers, and for smart, intelligent men there are good chances of promotion to the higher non-commissioned ranks.

□ □ □

## A MOTOR CYCLIST WITH THE FRENCH ARMY.

**WE** have received an interesting letter from a French rider, M. André Moulinié, who is an old reader of *The Motor Cycle*, and is now a "maréchal des logis motocycliste" with a heavy artillery group in the French Army. The five riders under him are, like himself, mounted on B.S.A. motor cycles. Triumphs are also used, and it is rumoured that twin Excelsiors have been tried with some aviation squads. M. Moulinié tells us that his men are well pleased with their mounts, though they have had some trouble with belt slip in bad weather, and that starting by means of the kick starter when the engine is cold is a difficult matter, making them long for a decompressor, as fitted on the Triumph. He has fitted an Endrick decompressor to his machine, and it has certainly improved it. So far the men have never had carburettor or ignition troubles. He points out that the district round Verdun is a very severe test for all motor bicycles, and that after fifteen minutes of rain the roads are so greasy that the men are obliged to proceed on low gear with both feet trailing on the ground.

Our correspondent was wounded on the occasion of the last attack at Verdun by a German gas shell. He had volunteered to deliver messages nightly round

Douaumont, and has received the Croix de Guerre for his services. He is now at home recuperating. Among the men under him, two are in hospital (one has been gassed, and the other badly burned, like himself), while yet another received a shrapnel bullet in the left arm.

□ □ □

## THE RECENT ATTACK ON ITALY.

**A** REPORT from Rome stated that near Idersko the Italian cavalry encountered German motor cycles with machine guns, which opened violent fire, decimating the horses and causing a retreat. The cavalry was obliged to return on foot.

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## PETROL RESTRICTIONS IN THE ARMY.

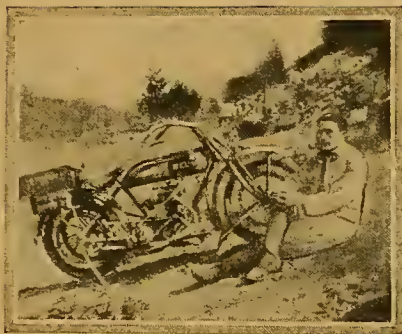
**A**N unusually pertinent remark occurs in a letter from Mechanist Staff-Sergeant Walker, an enthusiastic motor cyclist before the war. He says they are putting down a suction gas plant at their repair depot, so that brazing may be done by gas instead of by petrol blow lamps. Evidently the authorities have realised that there is room for the practising of petrol economy in the Army.

□ □ □

## A.S.C. AND INFANTRYMEN.

**"TWO GOLD STRIPES,"** now a motor cyclist attached to the R.A.M.C. unit, says: "Looking through the Military Notes recently, I was rather surprised to find such an assertion as was made by J. W. Pearson, *re* 'Danger and the A.S.C., M.T.' In my opinion, when any man makes an assertion like that he must naturally expect criticism; perhaps that is why he was not more explicit, and did not tell us what part of the line he was in, or whether he had been wounded or not. Despite the fact that he tells us he was in France for fourteen months—or rather, I should say, in the trenches—I must admit I doubt it; and I am sure there are many others, too, for in much less time than that he would have seen that

M.T. men take a fair share of the risks of war. Has J. W. Pearson never seen motor lorries taking ammunition to the various dumps or guns, which nowadays, in this artillery war, are usually well forward? Has he never seen ambulance cars moving along the roads immediately behind the lines, on dark nights too, when one can hardly see the bonnet; and also seen the man with the 'posh job,' after he has been stopped by some madly-careering horses, wondering whether his old 'bus will pick up quickly enough to get it in 'top' and get round the corner before 'Fritz' puts another salvo on it? No, I do not think he can have seen them.



## A FRENCH D.R.

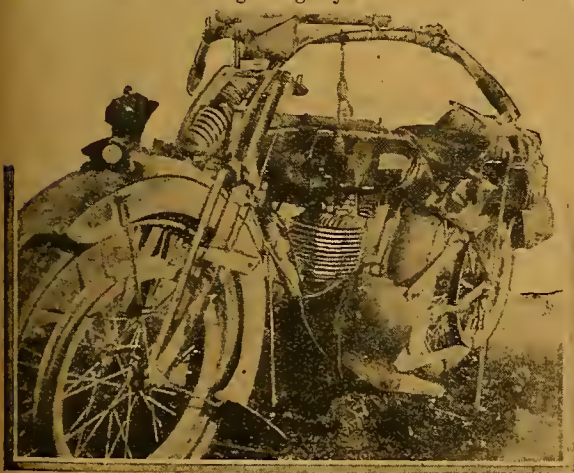
A French D.R. awaiting orders near the Aisne. The motor cycle is a B.S.A. The photograph was sent by M. Moulinié, a French reader.

"I have been through Ypres night after night for five months, so that I am pretty well acquainted with M.T. work—from Ypres to the Somme, from the Loos offensive to the present."

**EDITOR'S NOTE.**—During the last few weeks we have devoted considerable space in quoting letters on the question of the relative danger of the A.S.C., M.T., D.R.'s, and the infantry. But no matter how long the discussion may last there will always be a divergence of opinion, according to origin of the comment. It cannot be questioned that at times both D.R.'s and A.S.C., M.T., men perform work under exceptionally dangerous conditions. Neither can it be denied that a great many of them happen to be placed in circumstances that are not dangerous, and no useful end can be served by continuing the discussion, although we are glad at all times to receive letters from those who are serving abroad.



A despatch rider on the French Front wearing a gas mask of early design. The effect is reminiscent of the pictures one recalls of the maskers of the Spanish Inquisition.



A B.S.A. which has been through gruelling work in the district around Douaumont. Note the German helmet on footboard.



## HIGH PRESSURE GAS CONTAINERS.

The Wood-Milne Container: Its Possibilities and a Warning to the Enterprising Trader.

AN article in last week's issue of *The Autocar* casts some light upon the possibilities that lie ahead of the fabric-made pressure gas container. The writer states that Messrs. Wood-Milne, Ltd., have been inundated with enquiries since the publication of Mr. W. M. Barrett's lecture, and that it is impossible for them to answer all the correspondence they have received. In due course circular letters will be sent round to the majority of enquirers. "Perhaps," says the writer of the article, "I can save both the Wood-Milne Co. and the motoring public a lot of work and worry by explaining the position so far as it is possible to do so without revealing any business secrets. Letters have been received from people in every part of the United Kingdom, clamouring for the delivery of cylinders, which have not yet been made; motor dealers are pressing for local agencies, which it will be soon enough for the Wood-Milne Co. to arrange when they have got the machinery and labour to produce the goods."

### A Word of Warning.

The material to be used in the manufacture of the Wood-Milne container is at hand ready for use, and the labour problem is not insurmountable. The Wood-Milne Co. can turn out a few containers per week, but it is patent that to meet the demand they must equip a factory on lines to maintain a big sale.

Regarding prevailing impressions, the writer goes on to state that "many of the enquirers apparently imagine that a

Wood-Milne pressure container can be inflated from an ordinary gas supply by means of a rubber tube." This, of course, is ridiculous. Before the Wood-Milne Co. can send out their gas containers capable of storing something like the equivalent of a tin of petrol, they must install a big compression plant for testing purposes, and the people who buy the cylinders must be able to get them recharged at high pressure, or obviously they will be useless.

"There are suitable installations at many big refrigerating houses and other places, but they are too far apart to meet demands, and the Wood-Milne Co. are collecting all the information they can procure, so that they may be in a position to advise customers as to where they can obtain refills."

The writer ventures a word of advice and warning to the trade. "Do not be in too big a hurry to install compressor plants," he says. Many people have gone gas mad, and quite a number of motor dealers have been so far swept away as to talk about investing hundreds of pounds in compressor installations.

### Possibilities of Restriction.

In all probability the Wood-Milne container will have to go before the Home Office for test before it can be sold to the public, and, while this will retard the makers' plans, it may have even further reaching effects. The Home Office tests will have to be fully met, and it is quite possible that the Government may say that the cylinders shall be made under their control and the whole out-

put used for military and naval purposes. This does not imply that the naval and military authorities may consider the use of coal gas for aeroplane and lorry propulsion, for there are other uses to which pressure cylinders can be put.

### Recharging the Cylinders.

A few notes as regards recharging these cylinders are of special interest. The writer in our sister journal holds the opinion that gas companies themselves will undertake recharging on a large scale, which, of course, will rob dealers who have installed their own pumping machines of custom. Allusion is made to a small compressor installation capable of filling one Wood-Milne cylinder per hour, which can be purchased for between £20 and £25. A plant of double the capacity can be obtained for double the money, but, it is pointed out, "as the smaller unit pumping ten hours per day and six days per week would charge sixty cylinders per week, it would not be profitable to go to the larger expense if the demand did not exceed sixty refills per week." Other things panning out favourably, however, the compression problem will be solved very quickly. There are compressor plants all over the country, some of them in most unlikely places, and the supply will probably keep pace with the demand.

A good deal of confusion has arisen out of the Wood-Milne announcement to the effect that at 800 lb. per square inch pressure their container holds the equivalent of two gallons of petrol. The figure 800 should be 1,800.

## Fitting Hand Control Clutch to B.S.A.

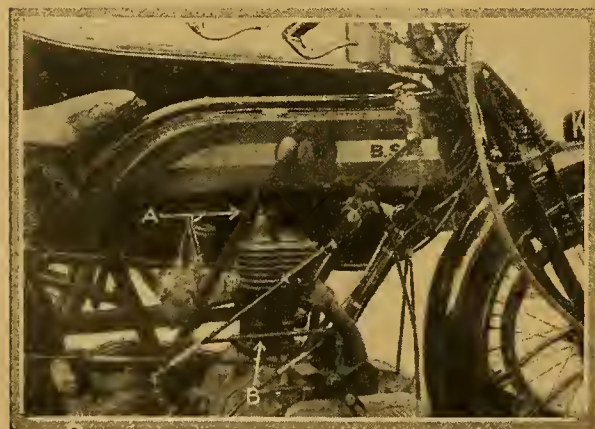
AN enthusiastic motor cyclist who resides in Karachi, India, sends rather interesting details of an alteration he has made to the clutch controls of his machine; and although the motor cycle in question was a B.S.A., there is no reason why the idea should not be of use to owners of other makes. He says:

"I found the foot clutch somewhat awkward to operate under the conditions which usually obtain out here, where such a thing as 'rule of the road' is quite unknown, or totally ignored, and pariah dogs, native urchins, camels in long strings, etc., vie with each other to make the riding of a motor cycle as dangerous as possible, so I devised and made the hand control shown in the accompanying photograph. You will note that the arrangement is quite simple, and consists of only two additional pieces—the lever A and connecting rod B. The former is made with a 3/16 in. boss at the lower end, which fits on the head of the bolt carrying the change-speed toothed quadrant, and kept thereon by a washer and split pin. On the top of the lever, which is tapered off, a blob of aluminium is cast to form a handhold. The connecting rod is made with a

wide fork end in front, which fits over the original actuating rod on the foot lever, thus avoiding any alteration to the original fittings other than a longer bolt to secure the two fork ends. The boss at the bottom of the lever being made a good fit on the fulcrum pin does away with the necessity of fixing a quadrant guide near the tank, and I have found from experience that I have absolute control of the machine under all conditions, and, what is also of great advantage, the clutch can be let in much more gently, thus avoiding harmful jerks on the chains.—H. TAYLOR."

### CURE OF A SOOTED PLUG.

INCIPIENT misfiring generally is due to a sooted plug. No experienced rider ever stops his engine and gets out his spanners until he has first tried whether an instantaneous no-trouble cure will work; and as this cure is almost equally applicable to minor carburettor troubles, its value is sufficiently apparent. The moment misfiring begins, and before the miss has a chance to stop the engine, throw out the clutch and open the throttle, allowing the engine to race madly for sixty seconds or so. As a rule, this simple expedient will cure the misfiring.



Showing the hand control of clutch in free engine position, as fitted to the Model H, B.S.A.



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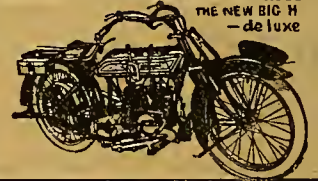


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LTD COVENTRY

—being engaged in munitions of war, ask the indulgence of their Agents and the Motor Cycle Public, while matters in Europe are being put right. Have your name entered for earliest delivery.



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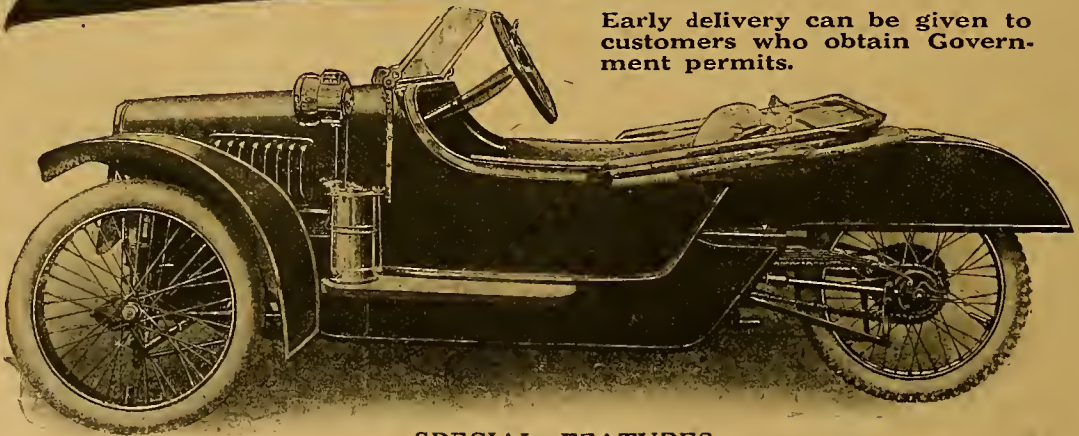
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**Morgan Runabout**



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Extra simplicity and strength of all working parts. Low centre of gravity, giving great stability. The safety and comfort of a motor car—even more reliable than the sidecar. Averages 50 to 60 miles per gallon. Motor Cycle Tax.

MORGAN MOTOR CO., LTD.,

Malvern Link.



# THE 1918 THOR MOTOR CYCLE.

Twin-cylinder Model rated at 18 h.p.

THE 1918 Thor motor cycle, manufactured by the Aurora Automatic Machinery Co., of Chicago, has undergone several minor alterations for the 1918 season. In fact, judging by the enthusiasm evinced in its description by our American contemporary, *Motor Cycling and Bicycling*, the new Thor is "some" machine. "Trim and trig as a soldier in the universal service uniform of khaki, trimmed with black striping edged with gold, the latest Thor looks fit to rush a trench or undergo the roughest service on road or field, and this is no camouflage."

We have previously described the Thor motor cycle (August 26th, 1915), and the main innovations that appear to have been made are a change in colour, improved mudguarding, improved spring forks, improved control system, and a new sidecar.

The colour is described on one page as khaki, and on another as "military olive drab," with a new combination of strip-

ing, and, of course, we ourselves have no means of forming an opinion as to the best descriptive terms that could be applied to this scheme.

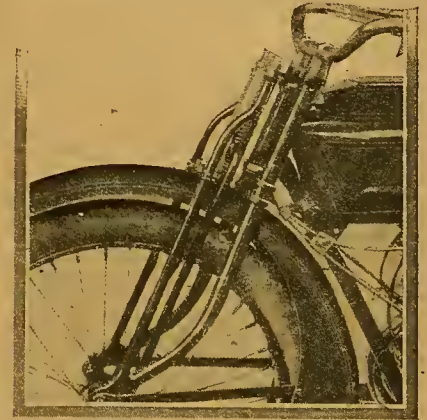
The improved mudguarding is self-evident in the illustration, and it will be noticed that the rear chain is covered for its entire length, but is not totally enclosed. This practice, by the way, has been followed by more than one English maker, and it is possible that some of our post-war models will have rear drive on the same lines. As regards the spring fork, we are simply told that it is of the triple stem type—a fact self-evident from the illustration—and that it ensures better riding. It is, however, interesting to us in the light of recent developments in springing designs in this country.

## Electric Equipment.

The innovation in the control system consists in leading the control wires through special "handle-bar tubes" instead of through the fork stem, as this

practice avoids short bends, and so minimises risks of broken control wires. The new sidecar (a Rogers) is equipped with a front connection specially designed to facilitate alignment of the sidecar and motor cycle.

The general appearance of the machine does not show any startling departure from Yankee ideas, but the slope of the back stand—or "starting stand" as it is called—is bound to attract attention. The engine dimensions are given below, and it is worth noting that the model illustrated is rated at 18 h.p., while the



The triple stem type front fork is of interesting design.

single-cylinder model is said to be of 8 h.p.! The machine may be purchased complete with electric lighting set, the Dixie ignition magneto being retained; the satisfactory working of the lighting dynamo is, therefore, not essential to the running of the machine, but only charges the lighting accumulators.

The 1918 model Thor. The engine is rated at 18 h.p. The cylinder dimensions are 82.5 x 92 mm., giving a cubical capacity of 976 c.c.

## A DASH ACROSS AMERICA.

"Cannonball" Baker's Attempt to beat the Transcontinental Record.

IN spite of the unfortunate termination of E. G. Baker's attempt to beat the American transcontinental record, some marvellous times were put up, chiefly over river beds, boulder-strewn mountain passes, and the heavy sand of the Missouri Valley. Up to the time of his accident, which Baker sustained well on in the ride, he was thirty-six hours ahead of the previous fastest time, and had safely overcome much of the most perilous and difficult going. The weather was by no means of the best. In the Alleghenies, Baker encountered rain, and at Vandalia the roads were impassable, and he was compelled to take to the railway track. Later the conditions became very trying. In the vicinity of Kansas City dust "a foot deep" was encountered for fifty miles, and in Ratun Pass recent rains had converted the trail into a quagmire, so that Baker was compelled to crawl on low gear for miles. The 365 miles from La Junta to Albuquerque took fourteen hours, but still

Baker was two days ahead of Bedell's record, though he lost another half-day between Albuquerque and the point of his accident.

Baker was descending the San Francisco mountain from a height of 6,700 feet when his fall occurred. Owing to the treachery of the surface and the sharpness of the bends, the Powerplus was throttled down to about 30 m.p.h. when the front wheel struck a boulder, bounced off it and hit another. Baker expresses the opinion that had he been travelling faster he could have kept going, but as it was he was thrown with one foot imprisoned under the machine, and was finally conveyed to hospital in an automobile.

## A Standard Mount.

The machine ridden by Baker in this last trip was a 1917 model N. Powerplus Indian—the identical machine on which he made both of the twenty-four-hour records at Cincinnati. It had standard

valves, and is claimed to be standard in every respect.

## SIDECAR RECORD FROM NEW YORK TO CHICAGO.

A NEW long-distance sidecar record has just been established in the States by Joseph B. Werner, riding a 1917 Harley-Davidson sidecar. Much rough going was encountered, and at certain points the greatest difficulties had to be overcome, the riders travelling day and night, while the fight against sleep was not among the least of their hardships during the latter portion of their journey. Time was lost once through having to change the rear wheel, owing to several spokes having broken due to the excessively rough going.

The distance covered was 932.6 miles. The trip was started at 4.15 a.m., September 11th, and finished at 12.29 a.m., September 13th, the nett running time being 40h. 3m.



# Current Chat

## TIMES TO LIGHT LAMPS.

### GREENWICH TIME.

Nov. 8th	...	4.51 p.m.
" 10th	...	4.48 "
" 12th	...	4.44 "
" 14th	...	4.41 "

## New South African Record Broken.

We have received a letter from Mr. W. H. Wells, in which he states that on October 30th a 7 h.p. Indian and sidecar, officially timed, created a new record between Johannesburg and Durban, breaking the old record by 32m.

## Trade Reconstruction.

A preliminary meeting is to be held this afternoon (November 8th), at 4.30, in the White Room, Savoy Hotel, for the purpose of discussing trade reorganisation after the war. Many invitations have been issued to those likely to be interested.

## Motor Cyclist on Russian Armoured Car.

W. Bishop, a well-known S. London competition rider, who, at the outbreak of war, was employed at a Portland Street motor cycle depot, is home from Russia after a good spell of service with the armoured cars. Bishop was amongst the first batch of A.S.C., M.T., motor cyclists drafted to Russia, and they were provided with quite an elaborate kit.

## A Japanese Reader of "The Motor Cycle."

Mr. U. Imai, of Osaka, is a Japanese who has been an enthusiastic reader of *The Motor Cycle* since 1913. He is the owner of three machines, an Invicta, a Triumph, and a Douglas, the favourite, he says, being the Baby Triumph, which is very suitable for the country in which he resides. He finishes his letter to us by wishing that the peace of the world will soon be restored by England's great efforts, and that he will see many new types of machines made by Great Britain.



A Japanese enthusiast, Mr. U. Imai, of Osaka.

## Brampton Brothers, Ltd.

The twelfth annual report of Brampton Brothers, Ltd., shows that a profit of £20,991 has been made on the year's trading, the directors recommending a dividend of 10% free of tax on the ordinary shares.

## Wit on the Bench.

Recently before the Kingston county magistrates a motor cyclist named Cedric George Hyde Anderson Horace Maynard was summoned for using a cut-out on his motor bicycle. "Is this one person?" asked the Chairman. "Yes, sir," replied P.C. Beck. "It is an unusually long name." The Clerk: "We ought to charge extra for making out the summons." (Laughter.) The defendant was fined £1.

## Demonstration of Stresses.

The second ordinary general meeting of the Institution of Automobile Engineers will be held in the Physics Lecture Room, University College, Gower Street, London, W., on Wednesday, November 14th, at 8 p.m. Dr. E. G. Coker will read a paper entitled "Photo Elasticity for Engineers," which is to deal with further important researches he has made on the demonstration of stresses by means of a polariscope. The principal illustrations will be shown by means of a lantern. Cards of invitation to the meeting may be obtained on application to the Secretary, Institution of Automobile Engineers, 28, Victoria Street, Westminster, London, S.W.

## Extract from some Ancient Correspondence in 1900.

The writer had been to Paris to purchase a French motor cycle, and, describing his visits to various factories, says: "The De Dion Bouton firm only recommend motor bicycles to be ridden in fine weather, as they consider it dangerous to ride on wet surfaces or through traffic."

He goes on to give his own opinion on the dangers of motor cycling. "It is all right when you are riding straight ahead, with both wheels in the same straight line, but in turning corners, or even to avoid anything on the road, it is extremely dangerous, as it stands to reason that any wheel driven by motive power has a strong tendency to skid and bring down the machine."

"It is simply courting danger to cross wet places and damp spots on the road. If any of your readers decide on getting a motor bicycle, I can only give them the advice my French friends gave me, *Méfiez vous, c'est très dangereuse* (Take care, it is very dangerous)."

## SPECIAL FEATURES.

### FIRST CLIMB OF THE ANDES

### MECHANICS FOR THE MOTOR CYCLIST.

### MORE ABOUT COAL GAS.

## Rubber Co.'s Dividend.

The directors of the Self-Sealing Rubber Co., Ltd., in their twenty-second annual report, recommend a dividend of 12½% on their ordinary shares.

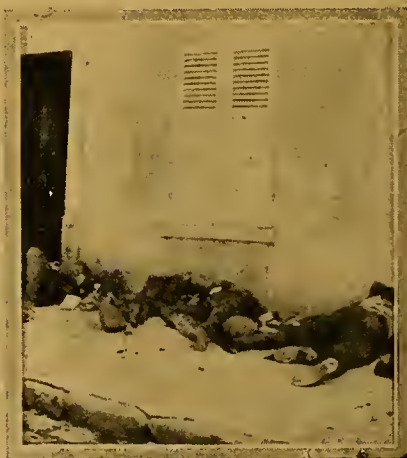
## The Transcontinental Record.

"Cannonball" Baker on a Powerplus Indian has made several attempts to break the record by crossing the American Continent in less than six days. Recently on his second attempt, with only 541 out of 3,296 miles to be covered, he struck a bad stretch of road while travelling at about sixty miles per hour, and severely sprained his ankle.

## Motor Cycle Police.

While, up to the present, the British police do not use motor cycles officially, we learn that three Powerplus Indians have been purchased by the Central Police Office in Tokyo, Japan, and also that their numbers will be increased shortly. Indian motor cycles are also used by the Imperial Japanese Post Office.

Once upon a time the West led the East. Is a change under way?



## NOT SO GRUESOME AS IT LOOKS.

This is not shell or gas effect but physical weariness. They are motor cyclists resting after a strenuous ride somewhere in France.



**Gas Fitters.**

It may convenience motor cyclists in the vicinity of Newcastle-on-Tyne to hear that Travers, Ltd., of that city, are making a speciality in equipping vehicles for the use of coal gas.

**Illuminated Speedometers.**

We have lately noted the happy suggestion that speedometer dials should be painted with luminous paint, just as so many wrist watches are at the present time. The idea is distinctly a good one, and is surely worth consideration on the part of speedometer manufacturers.

**Motor Cyclist's Successful Action.**

Capt. Ross, of the Woolwich Club, was successful in an action at Greenwich County Court on November 2nd, suing the owners of a motor lorry that crashed into his depot, damaging five machines and a stationary Matchless outside. The smash was described in *The Motor Cycle*, and judgment with costs was given for the plaintiff. The owner of the Matchless was a witness. A woman was also injured by the lorry.

**Composition of Petrol.**

In our issue of October 11th we referred to the chemical composition and formulae of the main constituents of "petrol." The formula of octane was given as  $C_8H_{18}$ , whereas it should have been  $C_8H_{18}$ ; the general formula of the paraffin series is  $C_nH_{2n+2}$ , that of "paraffin" itself being  $C_{10}H_{22}$  (decane) or  $C_{11}H_{24}$  (undecane).

**Nomenclature of Members of the Paraffin Series.**

Ambiguity or uncertainty attaches to the names of most of the commoner members of this extremely important series. Thus the first member,  $CH_4$ , is variously known as marsh gas and natural gas; that group of members which concerns us most is often described by a registered trade name of the product of one particular firm: "petrol" is a name registered by Messrs. Carless, Capel, and Leonard, but no one thinks of the particular products of this firm when they speak of petrol. Nevertheless, readers may have noticed that the advertisements say Shell or Pratt's "motor spirit," not petrol.

Similarly we speak of "paraffin" as though it were a definite substance, but it is the generic name of a whole group of substances, the only one of which that is referred to as "paraffin" in technical circles being "paraffin wax" ( $C_{20}H_{42}$ ), a substance solid at normal temperatures. The Americans refer to liquid paraffin as "kerosene," and the use of this term avoids much ambiguity.

**Coal Gas as Motor Fuel.**

An interesting discussion on the use of coal gas as a fuel for motor vehicles followed the sixth annual meeting of the British Commercial Gas Association. Mr. E. S. Shrapnell-Smith (Petroleum Economy Officer) suggested the use of liquid gas in vacuum jacketed bottles as being a means of storing the gas in quantity in a light container. He also announced another interesting fact—that the Local Government Board would shortly issue an Order permitting the use of trailers for carrying gas containers

without reducing their speed. It is not generally known that previous to this Order the use of trailers behind heavy four-wheeled vehicles is allowed only on condition that a reduced speed of 5 m.p.h. is maintained. So far, Mr. Shrapnell-Smith stated, there was no Order to the effect that gas may not be used for private motor vehicles, but there was a distinct feeling that private motoring should not be encouraged.

**The Boys of the Old Brigade.**

There is an interesting announcement in the *Gazette* of November 3rd which includes the names of that gallant band of motor cyclists who set forth to serve their country in 1914. The announcements read as follows:

**REGULAR FORCES.****Corps of Royal Engineers.**

Temporary lieutenants from Motor Cyclist Section R.E. Special Reserve to be temporary lieutenants (November 3rd, seniority from the dates stated): R. S. Mansfield (September 26th, 1914); J. D. Weir (November 27th, 1914); R. G. Larking, M.C., and V. Busby (June 28th); H. H. Berlandina, A. G. Marshall, and A. J. Harris (July 11th); C. F. Portal, D.S.O., M.C., T. Daish, M.C., C. H. Mocatta, W. Pyemount, M.C., F. R. Walls, A. Q. Roberts, A. H. G. Kerry, J. A. Scrutton, M.C., H. B. Blower, C. S. Burney, and H. J. Payne (December 11th, 1914); J. S. Hyde (May 20th); Temp. Capt. D. S. Hodgson-Jones, from Royal Fusiliers, to be temporary lieutenant (September 9th).

Temporary second-lieutenants from Motor Cyclist Section R.E. Special Reserve to be temporary second-lieutenants and to retain acting rank where specified (November 3rd, seniority from the date stated): E. Burton (February 27th, 1915); Act.-Capt. D. M. Mollison, F. Goodman, W. Joans, F. E. Thomas, J. W. Calvert, and H. S. Wheatham (May 8th, 1915); Act.-Lt. H. L. Banyard (June 7th, 1915); Act.-Capt. A. Tozer (June 30th, 1915); E. L. Brown (August 28th, 1915); R. C. Vernon (November 2nd, 1915); J. Erskine, H. M. Dommett, H. M. Wells, and H. Davies (December 7th, 1915); W. Scurr (December 23rd, 1915); H. Etherington (Jan. 8th, 1916); O. G. Breul (January 9th, 1916); H. R. Smith and F. C. Parkes (January 29th, 1916).

Of these, R. G. Larking sailed with the first expeditionary force from Ireland, while of those with him, Berlandina and Busby (both injured in the great retreat) were in the London Hospital together in August, 1914.

C. H. Mocatta, for some time a motor cyclist in France, is now in the Near East, and, though still R.E., no longer follows his original calling, and the same remarks apply to A. Q. Roberts and C. S. Burney, though they are serving nearer home.

Many of these splendid men figure in that excellent book, a true and accurate history of the D.R.'s in the early part of the war, "The Adventures of a Despatch Rider," by Maj. Watson, who was himself one of them.

**Gasolene Again.**

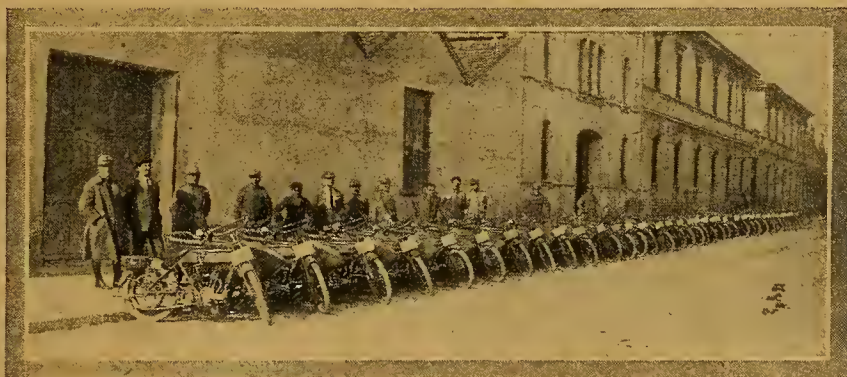
As we pointed out recently in *The Motor Cycle*, our American Ally calls petrol gasolene for short. Glancing through an American motor cycle paper the other day we saw a statement to the effect that a rider had covered a century on a gallon of "gas." This does not mean coal gas, but is the usual abbreviation for gasolene (petrol) in the States.

**An Attractive Form of War Service.**

The Auto Cycle Union has been asked, under the R.A.C. owner-drivers' scheme, to organise a motor cycle Messenger Detachment for carrying urgent despatches night and day between certain important Government departments. Details of the scheme are not yet settled, but any motor cyclist interested should apply at once to the Secretary, The Auto Cycle Union, 83, Pall Mall, London, S.W.1.

**A Sporting Challenge.**

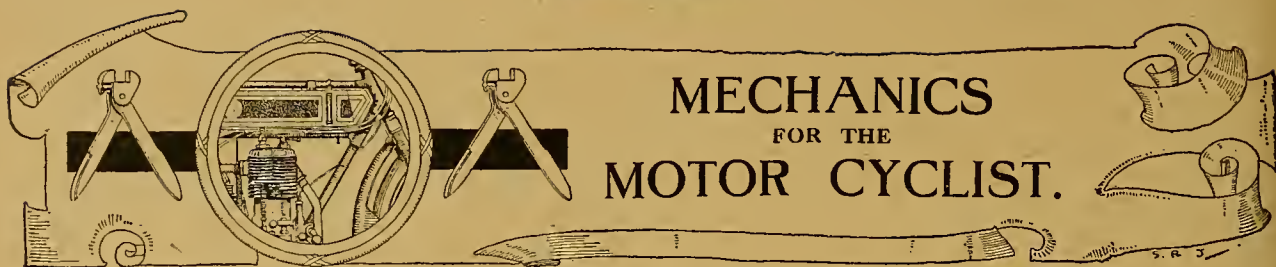
One or two letters in this week's correspondence pages open up the interesting question of sidecar weights. A light sidecar, which will stand up to its work as safely and satisfactorily as a heavy one, in addition to providing reasonable comfort, deserves some recognition, and it has been proved that the heaviest and strongest sidecars with very rigid couplings are the most susceptible to breakage. The drawback to a light sidecar when attached to a heavy machine lies in its tendency to leave the ground on left-hand bends when ridden empty.



ITALIAN W.D. MOTOR CYCLES.

A batch of 6-8 h.p. Stucchi sidecar outfits ready for delivery to the Italian Flying Corps.





## Seventh Instalment: STRENGTH OF MATERIALS. I.

(Previous instalments appeared on July 19th, August 9th, August 23rd, September 20th, October 4th, and October 25th.)

**T**HIS article is intended to appeal more to the reader who has ideas of his own concerning motor cycle design than to the road-burner *pur sang*. In theory, the proper way to design a machine of any kind is first to ascertain what force each part of the apparatus will have to sustain, and then to calculate the dimensions of the components so that the amount of metal in each is the minimum that will safely bear the load. There are some structures in dealing with which this procedure can be very closely followed—steel bridges, for example, for the bridge designer can estimate fairly accurately the forces in each member, and, knowing the strength of the steel he uses, is enabled to make each part just as strong as is required without the use of superfluous metal.

But there are very few items of a motor cycle which admit of treatment in the ideal fashion just outlined. Supposing some conscientious designer set out to calculate the dimensions of, say, a lamp bracket by this process. At the outset he encounters a pretty little problem in determining the maximum load on the bracket. It is not enough to know the weight of the heaviest lamp that can possibly be fixed on it: in addition he must be told the depth of the deepest pot-hole the front wheel will be called upon to traverse, the stiffness of the front fork springs, and sundry data of this nature. The practical designer consequently abandons mathematics and falls back on the much maligned, but entirely indispensable, rule-of-thumb method, relying on his judgment, or "engineering horse sense." He can tell—or he ought to be able to—by the look of the component on the drawing whether its strength is up to its work. He decides between the merits of alternative designs by their appearance on the drawing, in much the same way that persons of indifferent education (and some of very superior education) settle the spelling of a doubtful word by writing down two or three possible combinations of letters and selecting the most likely looking one. If the designer's judgment has been at fault he is soon made aware of it through the

agency of complaints of breakages from testers or customers.

### The Effects of Stresses.

Nevertheless, it may be of interest to have some idea of the effect of forces on metals when these forces do happen to be calculable. Everyone knows in general terms that up to a certain point the application of force to most solids produces no visible result. But if the force be increased beyond this point distortion of some kind is produced—the material stretches, crushes, or bends—and, if a sufficiently great force be applied, fracture occurs. Some substances, *i.e.*, indiarubber, although they yield to pressure, return

to their original shape when the pressure is relieved. These we term "elastic" materials. Other bodies, such as clay and putty, retain the altered form impressed on them by the application of the force. These are examples of "plastic" substances.

### Testing a Steel Bar.

If we now turn from generalities to scientific measurement, it will be found that so far from the majority of solids being able to resist moderate pressures without distortion the fact is that all materials, even the hardest steel, yield even to

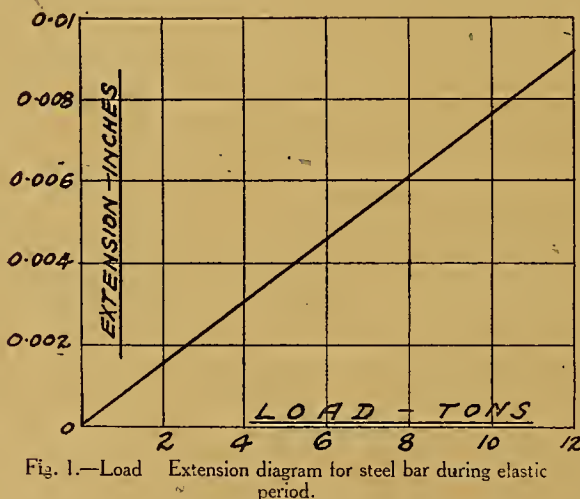


Fig. 1.—Load Extension diagram for steel bar during elastic period.

the slightest force. Of course, the amount of deformation may be very slight indeed, but it none the less exists. A structure of such apparently absolute rigidity as the Forth Bridge will deflect by a matter of inches during the passage of a train. The testing machine, by which known forces may be applied to specimens of the given material, enables us to make accurate measurements of the deformations produced. Let us consider a steel bar 1 in. square and 10 in. long subjected to tension—that is to say, the machine is arranged to pull the bar asunder. As the load is gradually applied, a ton at a time, although no change in length can be detected by such crude appliances as rules or dividers, yet the "extensometer" shows that each additional ton causes the bar to stretch nearly one-thousandth of an inch. Thus, a load of ten tons will produce a total change of length of



**Mechanics for the Motor Cyclist.**

perhaps 0.0075in. If now the load be removed it will be found that the specimen has returned to its original length; in brief, *the steel is elastic*, it behaves like a very stiff spring. The reader who has formed the commendable habit of thinking in terms of graphs will recognise the relation between load and extension in the accompanying diagram.

**Permanent Set.**

Now let the test bar be again loaded and the tension increased beyond ten tons. For a short time no difference is noticeable in the rate of stretch; but suddenly, at a load of about sixteen tons, the material perceptibly yields to an extent of a quarter of an inch or so. And this extension is *permanent*. The bar has finally been stretched a quarter of an inch, its length remaining 10¼in. even after the load is removed. The subsequent behaviour of the steel as the pull is still further increased becomes very tame and spiritless. The resistance falls off like that of a beaten tug-of-war team when once the victors have got fairly away, so that by the time fracture occurs, at a load of thirty tons or so, the specimen has stretched perhaps 3in., or 30% of its original length. A graph is furnished showing these changes.

Although the designer may be mildly interested in

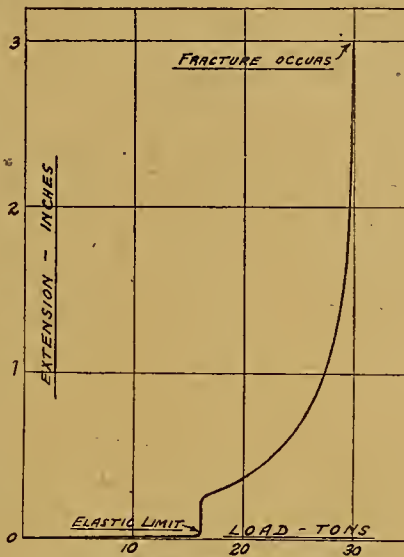


Fig. 2.—Complete load. Extension diagram for steel bar 1in. square.

knowing the maximum pull a piece of steel will sustain before breaking, he is much more concerned with the load at which the material becomes permanently deformed, or the "elastic limit." His aim is to ensure that the structures for which he is responsible not only will not break,

but will not suffer any "permanent set" even under the heaviest loads that may come upon them, and this condition can only be fulfilled by keeping the stresses well below the elastic limit. "Stress" may be defined as "load per unit area." The specimen whose behaviour we have been examining had a sectional area of one square inch; hence, in this case the stress is numerically equal to the load. In other cases the stress is obtained by dividing the load by the sectional area of the bar, e.g., the stress in a round bar half an inch in diameter under a load of three tons would be  $\frac{3}{0.196} = 15.3$  tons per square inch.

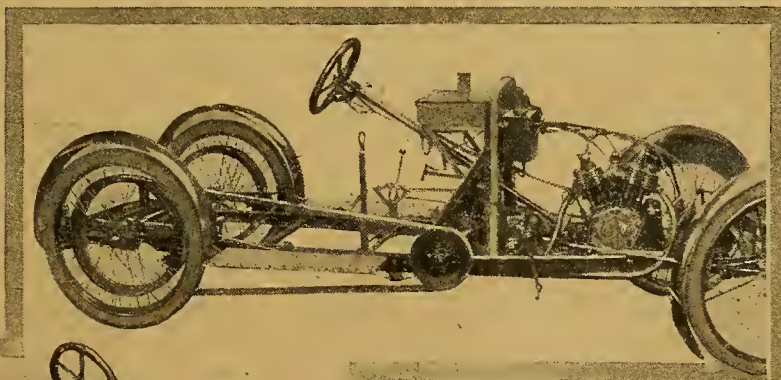
"Strain" is frequently used interchangeably with "stress"; but engineers attach entirely separate and distinct meanings to the terms. The former is used to denote the amount of stretch or deformation produced by the latter. Thus we may say that a stress of ten tons per square inch results in a strain of 0.0075in.

MOHANDIS.

(To be concluded.)

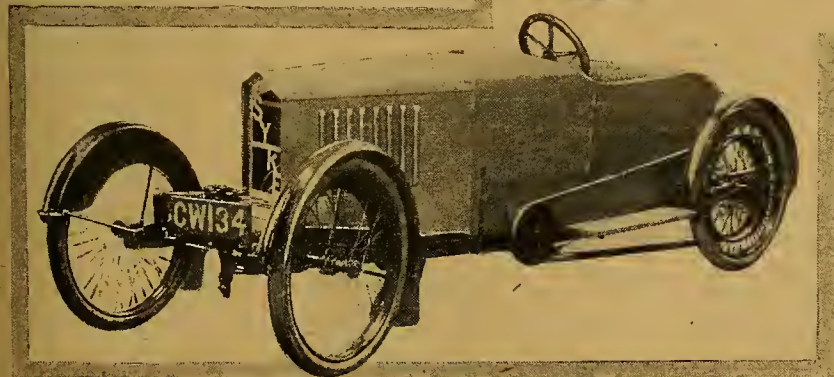
## An Air-cooled Belt-driven Cycle Car.

**A**N interesting cycle car recently constructed by Mr. John W. Taylor, of 3, Cobden Street, Harle Syke, Lancs., is depicted in the accompanying illustration. The motor power is a 5-6 h.p. twin-cylinder air-cooled motor cycle engine, and the car is provided with a countershaft carrying a three-speed gear box driven by a chain from the engine, and driving the rear wheels by two belts over 9in. pulleys. The frame is of pressed steel with



A simple cycle car. The chassis is constructed on conventional lines, but the body-work is unusually attractive.

channel cross-members, and the steering by duplicate cables wound on a 4in. bobbin mounted on the end of the steering pillar. The body is of metal with an aluminium bonnet, and provides seating accommodation for two. The engine controls are on the steering pillar, and the gear lever close at hand.





## TWO-STROKE ENGINE DESIGN.

A Miniature Engine of 90 c.c. developing 1 h.p.

**PARTICULARS** have recently appeared in one or two American technical journals of a rather striking miniature two-stroke engine. The bore is only 2 in. and the stroke 1 1/2 in. (50.8 x 44.5 mm., 90 c.c.), and the power developed is 1 h.p. at approximately 2,250 revolutions per minute. This, of course, is considerably above normal two-stroke engine speed, and the means by which this speed is obtained are rather interesting.

There is really very little startling departure from standard principles of construction employed in the manufacture of the engine, but all reciprocating parts are made as light as possible. The arrangement of the ports has admittedly been determined entirely from empirical data, and the designer does not claim that he has arrived at the most perfect setting. The sketches of the engine, which are reproduced herewith, illustrate the novel position of the silencer, which is situated close up against the cylinder. The reason for this latter practice is that it is claimed that as the exhaust gases can expand immediately they leave the cylinder, the likelihood of choking up of the exhaust port and the general troubles following from this weakness are obviated; also that the cylinder in the region of the exhaust port is kept much cooler than would be the case had the exhaust gases to travel down the normal exhaust pipe.

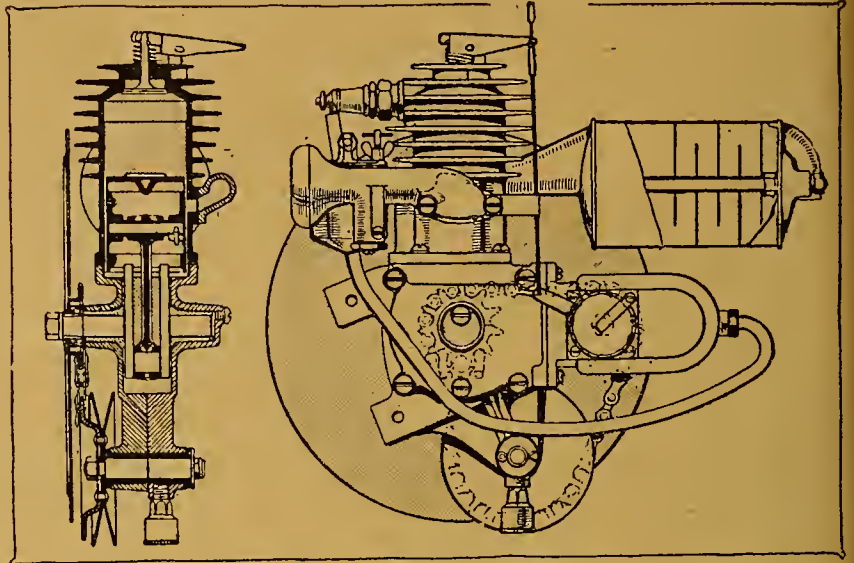
### The Transmission.

Perhaps the most startling departure from the conventional in the whole of the engine is the means by which the driving pulley is driven. It will be seen that there is a chain running round the sprocket on the main shaft of the engine, and also round the magneto, and that this chain also embraces the third sprocket, so that it resembles the camshaft driving chain in a car timing gear. This third sprocket (*i.e.*, the largest of the three illustrated) is, however, attached to the driving pulley of the motor, so that the actual driving is effected through a reducing gear, the reduction being in the ratio of 2 to 1;

thus, with an engine speed of, say, 4,000 r.p.m.—a speed which is claimed as possible for this engine—the speed of the driving pulley would be 2,000 r.p.m. In the description of the engine it is stated that this driving chain is of first-class English manufacture, but as its linear velocity may be as high as 1,800 feet per minute, even the manufacturers have been surprised at the way this

cylinder castings are rough machined, and then allowed to age for a period of some two months. At the end of that time they are finished off, after going through a process of annealing. The maximum allowable difference in the diameter of the cylinder and piston is .003 in., while the minimum is .001 in.

It would seem that one of the main difficulties in an engine of this type



An American design of a miniature two-stroke engine of 90 c.c.  
It is rated at 1 h.p.

chain has stood up to its work. Looked at as in the diagram, the direction of revolution of the engine is clockwise, so that the sprocket mounted on the main shaft exercises a direct pull on the driving sprocket, and the magneto sprocket is operated by the chain in the loose half of its run.

### A Moderate Road Speed.

We have suggested that the manufacture of this engine is carried out with the utmost care. Illustrative of this point, we may say that the piston and

would be the lubrication question, but this appears to have been overcome quite satisfactorily. It is intended that the machine should have a maximum road speed of something in the neighborhood of twenty miles per hour, corresponding to an engine speed of some 3,000 r.p.m. On account of the short stroke of the engine, the piston speed under these conditions would be only some 875 feet per minute, which, of course, is very low indeed for this type of engine, and on account of this low piston speed the lubrication problem has been easily met.

## Reduction Valves for Gas Cylinders.

**THE** following extracts are from a letter published in last week's issue of *The Autocar* from Messrs. Wood-Milne, producers of the fabric pressure gas cylinder, described recently in a lecture by Mr. W. M. Barrett:

"The question of a reducing valve has become very much clearer during the last few days. We are advised that a reducing valve has been brought forward which is capable of bringing the gas down from high pressure to 4 lb. The gas is then passed through the petrol tank (which is called an expansion chamber), and in this expansion chamber the gas would assume 3/4 th water column. It would then be carried from the tank to the induction pipe without disturbing

the existing carburettor. In addition we are advised that a valve is already on the market capable of regulating the pressure of gas to the engine from 2,000 lb. per square inch to zero or any pressure desired.

"We have already been advised that compression plants have been installed or are in process of installation at the following places: Manchester, Oldham, Huddersfield, Bradford, Sheffield, Grimsby, Liverpool, Chester, Leeds, Llandrindod Wells, Halifax, and Mansfield.

"We are not yet able to state a definite price, but the cost of the cylinder will be approximately less than the cost of a flexible bag of the same capacity.

"CONTAINERS FOR MOTOR CYCLES AND SMALL OR LIGHT CARS.

"This is a question which is having our attention.

"We hope shortly to be able to make an announcement regarding the manufacture of smaller cylinders for this purpose. It is hoped that at an early date the main question—that of compressors—will have been solved.

"We hope to be in a position to demonstrate the container, with the reducing valve, in Manchester very shortly. A further intimation will be made when this can be done."

Elsewhere in this issue we deal more fully with this subject, and enter into the matter of the production of cylinders.



## Through Feminine Goggles.



(1) In pre-war times, when touring was the order of the day.

(2) Miss Gill, of Westcott, Surrey, a Red Cross worker, finds her Douglas of great use.

(3) In a country village with a 6 h.p. Enfield.



THE lady motor cyclist who, before the war, rode only on pleasure bent has disappeared. Ladies who continue to ride now use their machines for stern necessity. There is no petrol to be spared in these days for joy rides and touring. The small allotment must be eked out on strenuous work that often occupies seven days a week.

The growing familiarity between women and this ideal means of conveyance will result in an increased demand for machines by many who can afford them. It remains to be seen whether the diamond or open frame will be the favourite type. All those women who now act as motor cyclists attached to the flying corps will not be satisfied, at the close of hostilities, to say a final farewell to the mounts that have given them so much pleasure. They have, too, in many cases, proved a capability in handling a motor cycle that some ten years earlier it would have been considered "unwomanly" to attempt to drive. I recently saw a girl smartly dressed in the khaki uniform and the plain hat that is part of the outfit of the Women's Auxiliary Corps driving a P. and M. sidecar machine down the London-Brighton road. She was handling her machine carefully and unobtrusively, and was indeed a credit to the unit to which she belonged.

Another diligent war worker and motor cyclist, whose duties, although of a different type, are yet as strictly necessitous, is that of Miss Gill, a well-known Surrey figure. This rider of some two and a half years' standing has never ridden any make except the open-framed Douglas, but, being perfectly satisfied, she has no longings towards any other.

Miss Gill tells me that she has tried to use substitute, but without much success. In the cold weather starting up was so difficult that it was not worth while. The machine has been in use since March, 1915, and the most serious trouble was on one occasion when the gears were stripped, and this Miss Gill thinks might not have happened had more care been used in changing down. The magneto, too, has caused some trouble, but the amount of gruelling that a machine used so much as this one undergoes is bound to discover any weak spots. After the war, when petrol can be purchased anywhere and everywhere without the tiresome permit, Miss Gill hopes to try touring, but not yet, alas! as now during the owner's holiday the local repairer gives it an overhaul. The usual adjustments to belt, carburetter, and plugs are within the rider's capabilities. Unfortunately, at the present moment, the kick-starter is out of order, owing to a broken clutch pin, but the machine can be so ill spared, and replacements are well-nigh impossible to obtain, that a running mount or paddling off must be resorted to. This is a disadvantage when the road inclines upwards, and the usual plan in this case is to coast to the bottom of the hill and to return after making a start on the level road. During war time one must be prepared to make shifts that a few years earlier, when labour and spares were easily bought, would not have been necessary.

MAY WALKER.



# LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

## MUNITION WORKERS AND THE PETROL RESTRICTIONS.

Sir,—A committee representing the motorists employed at the R.A.F. has been formed with a view to an appeal to the authorities for a sympathetic reconsideration of their decision with regard to motor fuel for munition workers, the idea being to ascertain the number involved and to forward their names on a petition form stating their case.

(1.) After seven days' or nights' work in vitiated atmosphere and artificial light, it is necessary to utilise the few hours off in the most advantageous manner possible to recruit health and the power of physical resistance against sickness and disease.

(2.) For shopping. Congested train and inadequate bus service creates a monopoly for the local traders, the recognised shopping centres frequently being miles distant from factories, apart from the problem of delivery.

(3.) Housing problem and quick transit. Men frequently have anything up to twenty miles journey to and from work, owing to lack of housing accommodation.

J. SPARKS.

## FLYING FACTS AND THEORIES.

Sir,—I have just read in your issue of Oct. 11th an unsigned article on the theory of flight. I do not know if the author is a pilot, but I venture to doubt it, and also to question his assertion that "turning an aeroplane 'up wind' and 'down wind'" are not different operations. Every embryo pilot is impressed by his instructors with the danger of turning down wind close to the ground. Why? Because a machine stalls far more easily if turned down than up wind, and for this reason: Suppose the speed necessary to keep the machine in the air to be 50 m.p.h. and the speed of the wind to be 30 m.p.h., an aeroplane travelling up wind has a speed relative to the ground of 20 m.p.h., and in order to support itself whilst travelling in the opposite direction it must have a ground speed of 80 m.p.h. It is scarcely prudent to ignore the earth in this matter, as this is where momentum, apparently forgotten by your contributor, plays an important part, it being obviously a slower business to lose a velocity of 20 m.p.h. in one direction and gain one of 80 m.p.h. in the opposite direction, than to lose one of 80 m.p.h. and gain 20 m.p.h. Similarly, a machine turning down wind needs less bank than one turning up wind, as, having less ground speed, it has less momentum to lose, and the centrifugal force is nothing like so great.

I have not yet seen your issue of October 18th so do not know if any other criticisms of this article have reached you, but it appears to me that such an article might possibly be extremely dangerous by giving some inexperienced pilot the courage of the author's convictions.

O.J.F.S., LIETT. R.F.C.

[Our correspondent is, we fear, labouring under a misapprehension. The question of momentum which he raises will be considered in a later article.—Ed.]

## A SPORTING CHALLENGE.

Sir,—The expression "Any fool can make a sidecar" has been used times without number during the past ten years; it is true, of course, but, all the same, the individual referred to will not make the best and lightest sidecar, which, of course, everybody wants.

You have done good service in more ways than one in giving publicity to the test, single v. twin, recorded in your issue of November 1st. As the designer and manufacturer of the Montgomery sidecar used with the twin, I

beg to assure you it was an absolutely standard model in every way fitted with four attachments, 650×65 mm. heavy tyre, and 5in. wide mudguard with inside shield. It was made and fitted to the motor cycle used in the test four months ago, and the only alteration for this event was substituting the "Lounge" model body originally fitted for our standard touring "Doris" model body, which allows more freedom for the handle-bars in steering, and incidentally weighs 12 lb. less. We do not make a heavy touring attachment.

It is only fair to state that the difference in weight of sidecars was more than made good by the riders' weight, which would not be less than 40 or 50 lb. in favour of the Triumph, and the insinuation that an unsporting advantage had been taken ought certainly to be withdrawn.

Since Mr. G. Brough has been engaged on munition work in Coventry, he has purchased ten Montgomery sidecars for attachment to various makes of motor cycles, and it is this experience which no doubt gave him confidence to drive at a speed which has probably never before been touched by a motor cycle and sidecar on the road.

I think it ought to be clearly stated that the Triumph sidecar was fitted with a special streamline body, which the ordinary purchaser could not buy, and it is only reasonable to assume they fitted the lightest Gloria chassis consistent with strength and safety. W. MONTGOMERY.

Sir,—In your article headed "A Sporting Challenge," much is said about sidecar weights, which, in my opinion, has little to do with the calculations arrived at from the test. No mention is made of the obvious advantages the Triumph Co. gained in the matter of passengers carried and cycle weights. I used a standard touring Montgomery sidecar, and am sending you a photograph taken from the sidecar side of the outfit, so that readers can judge for themselves as to whether there is anything exceptional about it.



In your endeavours to give credit to my opponents for a splendid performance, you fail to do justice to the machine I used, which, after all, was a standard, privately owned outfit, tuned up at a country house, and it won with more than two miles in hand against a post-war, works tuned single, ridden by the world's leading single-cylinder exponent. GEORGE BROUGH.



**PETROL WASTE.**

Sir,—I live in a part of the U.K. where tins of petrol by the score and hundred are washed in from the sea for many miles up and down the shore on sandy beach and rocky cliff base. The Coastguards are provided with nippers to cut off the brass nozzle and cap, and the tin and the petrol are thrown back into the sea. Is there no way to stop such insane and wicked waste? **FAIR PLAY.**

Camborne.

**A FLAT TWIN TWO-STROKE.**

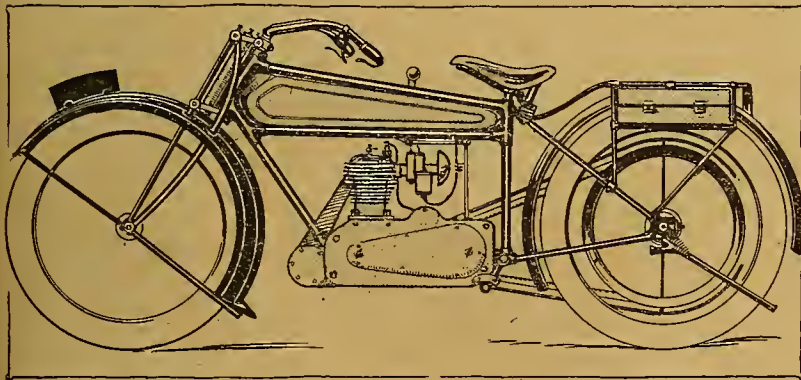
Sir,—In the many most interesting discussions that have taken place in the pages of *The Motor Cycle* on the respective merits of the flat twin and single, one point seems to be more or less agreed upon, namely, that in heavy uphill work the single scores every time, by reason of its power of slow, steady pulling under load. The flat twin also gets up the hill, but only by largely increasing the number of revolutions and a low gear. This seems to me to be a matter of leverage—i.e., the longer the stroke the greater the leverage on the crankshaft. Obviously, the single or V type engine must always beat the four-stroke horizontal on this point, if the latter is to be placed in a motor cycle frame that can get round a corner without upsetting the traffic. This brings me to my point. What is the matter with the two-stroke flat twin? In this engine the two explosions occur simultaneously, and, supposing the stroke of the pistons to be three inches, the combined twist on the crankshaft is equal to that of one piston with a stroke of six inches. This type of engine should be a perfect whale on hills, in spite of the low m.e.p., and of the fact that it shoots about 20% of its almost priceless mixture head over heels unused and uncared for down the exhaust pipe. The simultaneous occurrence of two explosions is usually considered a disadvantage in horizontal two-strokes, when this type is compared with the flat four-stroker. To my mind it is just the reverse, for the two-cycle engine can be given a considerably shorter stroke and still have the advantage in the matter of leverage over the aforesaid flat four-stroke, and this result is obtained in a much more compact engine.

**CAPT., R.A.M.C.**

Newbury.

**MY IDEAL MEDIUM WEIGHT.**

Sir,—I send a sketch and specification of a motor cycle which I designed in the summer of 1915. Although, owing to various reasons, I was never able to get the machine beyond the paper stage, nevertheless I enclose a sketch of the model, in the hope that it may be of interest to your subscribers.



A reader's ideal, embodying the often recommended unit construction.  
(See accompanying letter from "Rismaca.")

The principle largely involved in the design is power unit protection. It will be noticed that I have brought the engine, magneto, and gear box into the centre of the frame, so making it a comparatively simple matter to box them in completely, as shown.

The aluminium covering would be cast in two quickly detachable halves, which would be completely grease and weather-proof when bolted together by three butterfly nuts. By making the casing water-tight one could dispense with chain cases to magneto and gear box, thereby saving weight and rendering these far more accessible.

I have not enclosed the carburetter, as during five years' motor cycling I have never had any trouble with this part of the machine when efficient air gauzes and petrol strainers are fitted. Attached to the end of the air inlet pipe, however, will be noticed a bell-mouthed apparatus for supplying partly forced air feed. A fine mesh gauze is fitted to this air collector, and helps to arrest all foreign matter. This fitment has given exceptionally good petrol consumption and freedom from carburetter cleaning.

A light 2½ in. guard covers the belt both above and below, and would render it practically non-slipping in the worst weather.

As regards the rest of the machine, my original specification was as follows: 3½ h.p. Norton engine and oiling system; Rudge enclosed spring fork and spring-up stand; A.J.S. front guards, clutch, and gear box; Sunbeam 8 in. back mudguard; semi-touring handle-bars, as shown, 30 in. wide; adjustable footrests; 26×2½ in. tyres; and large pannier toolbags.

A machine such as the above, and of a weight not exceeding 200 lb., in my opinion, would be the ideal all-service mount.

**RISMACA.**

Dublin.

**THE NEW PETROL REGULATIONS.**

Sir,—As a matter of vital interest to the motor trade generally, I should like to hear if anything is being done with regard to the last severe blow which the trade has received in the matter of the recent petrol restrictions. Under the old restrictions the outlook was bad enough, but this is the last straw. It makes it impossible for us to pay rent, rates, and taxes, and general upkeep of business. Does the Government wish to close down the whole of the motor trade? If not, what can be the object?

If any steps are being taken to bring this matter before the Government with the object of drawing its attention to the hardship inflicted upon what is, after all, a utility more than a luxury trade, I should be glad to hear of such steps, and to assist in obtaining the support of as many firms in this district (Doncaster) as possible, and I feel sure that such representations would receive the support of the trade throughout the country.

**J. A. BASSETT.**

Sir,—I was glad to see you had raised the question in your editorial in the issue of October 25th as to why should not those who have purchased their petrol with old licences use it instead of keeping it for nothing. I got some petrol by the very first licences which were ever issued, about June, 1916, and have on hand still five gallons. I have not used my little bicycle for the last 1½ years, as we

have been away from home during the holidays, but now we are back, and I leave school in December, I wish to use my bicycle before joining up. This, however, under existing conditions, is impossible. Can you use your influence in this respect? I am sure, too, there are many others in the same position.

**LM 2904.**

Edinburgh.

Sir,—I have read your remarks *re* the use of motor cycles or cars for soldiers on short leave, and also *re* the use of petrol which has been obtained in a perfectly legitimate manner and saved for emergencies.

I agree with you that the former should receive special consideration, and, if the owner is not allowed to use what petrol he has saved for other purposes than business, he should be allowed to dispose of it.

I think pressure should be brought to bear upon the authorities to give consideration to both matters, and stop the owners of motor cycles and cars from obtaining further supplies of petrol if the purpose for which it is used does not justify a further allowance, instead of penalising them when they have paid for it.

**Leigh.**

**AVERAGE SPEED.**

Sir,—I was more than interested to read the letter in the issue of October 11th from "E.K., R.F.C.," Farnborough, as I at once knew the writer thereof.



I sincerely hope that Capt. G. Hodgson accepts "E.K.'s" challenge, as it would be an eye-opener to a few. I happened to be with "E.K." on one occasion when he attained the speed mentioned—75 m.p.h. on a standard  $3\frac{1}{4}$  h.p. Sunbeam—and can therefore vouch for the accuracy of his assertion.

ALEC H. JENKINS, FL.-Sgt., R.F.C.

Sir,—In the letter by "J.A.H." re average speed, an editorial note mentioned 76.69 m.p.h. as the  $3\frac{1}{4}$  h.p. record for one mile. May we mention that this has been surpassed by the Norton  $3\frac{1}{4}$  h.p. with a speed of 78.95 m.p.h. for the mile, the kilometre speed being 82.85 m.p.h.?

NORTON MOTORS, LTD.

#### ACETYLENE AS A MOTOR FUEL.

Sir,—With reference to the absorption of acetylene in paraffin. The apparatus used was quite simple, as the enclosed diagram shows. A bottle was filled with paraffin and inverted over a bowl. Gas was then bubbled into the bottle by means of a tube connected to a generator. When the acetylene had displaced about half the paraffin, the bottle was corked up, and its contents well shaken and again inverted over the bowl. The rise in level of the liquid in the bottle indicated the volume of gas dissolved.

This operation was repeated until a sufficient quantity had entered into solution. Theoretically, there should be equal volumes of each, but practically it is a tedious matter to get the paraffin completely saturated. For purifying the gas only the filter with which generators are usually fitted was used.

There are two points I should like to bring to your notice. Firstly, the acetylene was not used as a fuel substitute, but to give increased flexibility to the engine.

Secondly, this method is not applicable in a case where the petrol pipe is heated before reaching the carburetter. The increase in temperature would make the gas come out of solution and possibly cause a lock in the pipe.

Being very busy on Government work, I have not had time to investigate any further on the subject, but should any little point needing explanation arise I shall be pleased to offer a suggestion.

RICHARD G. HOWARD, A.C.G.I., B.Sc.

#### MOTOR CYCLING FOR THE MAIMED.

Sir,—The case of "Handicapped," whose letter I read in your estimable journal *The Motor Cycle* of October 18th, has touched me very much, as I have a brother who is exactly in the same position.

Having, at the age of eight years, lost his right leg from the knee owing to a carriage accident, this did not prevent him later from becoming a famous tandem rider, and the road races won by him cannot be counted! Later he became a famous motor cyclist, and, in spite of his enormous weight of 125 kilog. and his wooden leg, he did not find his equal, and always won the races for which he entered.

His favourite machine is the Rudge-Whitworth, which he finds, after many trials of diverse makes, the easiest to handle, the most suitable upon the road, and of remarkable simplicity.

My brother has not been able to make use of an artificial leg (he has no articulation of the knee), and after long and painful trials he has definitely adopted the wooden stump leg, and is very pleased with it, both for motor cycling and for general use.

If "Handicapped" will give me the pleasure of writing me a few words, letting me have his address, I am in a position to give him some valuable advice which will be useful to him, and I should be truly happy to help this courageous man owing to my knowledge of his difficulties.

Paris.

ALFRED ISKENDER.

Sir,—I may mention I am a one-legged rider, and therefore interested in the letter in your issue of October 18th. I

should advise the writer to use a combination rather than a solo machine, as the latter requires a fair amount of experience, and is, of course, more liable to accident on a greasy surface.

I have ridden several makes of machines since I lost my leg three years ago, and I favour the powerful twin on account of its hill-climbing ability, as it is rather awkward to get a stop on a hill through lack of power. I am at present using a 7-9 h.p. Indian. My missing leg is the left, but I can kick start either side of a machine with my remaining leg (not the artificial limb). We must not expect too much from this beyond what it is intended for, viz., walking. If the writer could not operate a kick starter, a handle starter of the Enfield type would overcome the difficulty. By no means should the writer consider himself handicapped.

WALTER J. DERTY.

#### THE MEN BEHIND THE LINES.

Sir,—Having read your correspondent "Archie's" remarks in the "Blue 'Un" for October 4th, I should like to second him, but fail to see why it should be necessary to plead the case of the A.S.C.

From recent accounts I believe the M.T. casualty list is well up, if not top, whereas the honours are very much behind.

In a previous issue I noticed a picture of some Denms lorries under shell fire. May I say that on a certain part of the line, where I have been for some months, one can see similar incidents every day and night?

The tractor section also has its share of trouble. I have often heard infantry growl, on coming out of the trenches, because a caterpillar has been making a "row" and drawing shell fire all round it.

Enough of this! There are all sort of jobs "cushy" and otherwise in all units, and some sections of the A.S.C. deserve as much praise as anyone.

Why? I can explain, but will not waste time. However, whether they get it or not, I am sure their consciences will be clear, having done their bit. That counts a little.

B.E.F.

HOOJAH (Sgt., R.G.A.).

#### PUSHER OR TRACTOR.

Sir,—Mr. W. G. Aston states, in his article "Pusher or Tractor" in your issue dated October 25th, that it is a fallacy to suppose that a "pusher" screw is working more advantageously because of the air the machine is dragging forward. It may be so, but I for one doubt it.

I seem to remember that once upon a time a certain naval constructor designed a hull, which when undergoing its "measured mile" tests exceeded its designed speed by an appreciable amount, and on the reason being sought it was calculated that to attain this speed the propeller had to possess an efficiency of over 100. Ridiculous! cried the engineering world concerned. However, further investigation proved that the displacement caused by the hull in motion tended to set up a flow of water which opposed that of the "slip stream," with the result, which I believe has since become generally admitted to be correct, that an efficiency of over 100 was attained.

If this is true with water, why is it ridiculous to suppose similar conditions obtain with air?

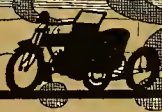
With regard to Mr. Aston's reasoning that "if such were the case an indefinitely high efficiency in the screw could be obtained by putting it behind ill-designed planes, which is absurd," I also disagree. I maintain, by reason of what I have said above, that it is possible to increase the efficiency of the screw in this way, though, of course, that of the machine as a whole would suffer more than proportionately. It is, to my way of thinking, exactly analogous to a slipping clutch in the case of a car when ascending a hill: if it were not for the clutch slip, the engine would be working more slowly, and therefore under a disadvantage as regards efficiency, though the machine as a whole is less efficient, in that more useless work is being done—in the one case in the form of eddy currents, and in the case taken as an analogy in the form of heat.

Of course, in the case of the pusher type aeroplane, no streamlining can be so perfect but that some eddy currents or counter currents of the body are created. By placing the screw to take advantage of these currents, some of the lost energy they represent can be reclaimed. I should imagine.

H. BULLIN.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## Petrol Consumption

**?** I have a 1915 two-stroke, which I bought second-hand. I get only 50 m.p.g., and I should be glad to have your advice on the following questions. The carburettor is a B. and B. (jet No. 30). (1.) What size jet would you advise? (2.) The bore is 73 mm. What is the h.p. of the machine?—H.E.M.

(1.) You might try as small a jet as a 24, then perhaps your petrol consumption would be better. (2.) About 2½ h.p.

## Running on Heavy Fuel.

**?** (1.) Can an ordinary motor cycle be fitted to run entirely on paraffin? If so: (2.) What alterations are necessary, and (approximately) how much would they cost? (3.) Is there any limit fixed by the authorities as to the amount of paraffin one may buy? (4.) What are the chief disadvantages met with in paraffin used as a fuel compared with petrol?—K.M.L.

(1.) An ordinary motor cycle can be run entirely on paraffin, provided it is started first of all on a lighter fuel. (2.) The extra fittings would be a hot air intake to the carburettor, and perhaps it might be even necessary to fit a longer fuel pipe, which could be brought twice round the cylinder head, so as to warm the fuel before reaching the float chamber. The cost is quite small; we cannot tell you exactly. (3.) Yes, paraffin must not be purchased as a fuel for a motor cycle without being first of all entered on a petrol licence. (4.) The disadvantages are that the engine knocks on the slightest provocation and that the lubrication requires rather more attention. A good heavy bodied oil should be used, and the crank case should be washed out fairly frequently and fresh oil inserted. It is generally advantageous to reduce the compression by inserting a cardboard joint between cylinder and crank case.

## Timing.

**?** Would you kindly tell me the correct valve timing of a Triumph and a Douglas motor cycle engine?—G.G.E.

**Triumph:** The exhaust valve should open ¼ in. from the bottom of the firing stroke and close dead on the top of the stroke. The inlet valve should begin to open when the piston is at the top of the stroke and close ¼ in. up the compression stroke. **Magneto:** Place the piston exactly on top of the compression stroke and connect up the magneto with the points just about to break, and the

ignition lever two-thirds retarded. This will mean that the explosion, when the ignition is fully retarded, will take place when the piston has travelled about 1.5 mm. down the firing stroke. **Douglas:** The exhaust valve closes ¼ in. after the piston has completed the exhaust stroke. The inlet valve opens ¼ in. after the piston has begun the induction stroke. The magneto should be timed as follows: Turn the flywheel round until the exact moment of closing of the exhaust valve of either cylinder. The pistons should then be at the outward end of the stroke. This position may be located by the keyway of the flywheel being at the rear of the machine. When the rear valve just closes, the front cylinder is at the firing point, and *vice versa*. Therefore, in timing the front cylinder, place the magneto advance lever midway between full advance and retard, and turn the magneto driving wheel until the contacts are just separating. When the spark is correctly timed for one cylinder it is correctly timed for both.

## IMPORTANT NOTICE.

### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

## Oil Leakage.

**?** I have a 1910 Triumph motor cycle which throws out a considerable quantity of oil between the crank case and pulley. This oil gets on to the magneto in front, on the back mudguard, and on the belt rim, thus causing the belt to slip considerably. I shall be grateful if you will advise me what to do to remedy this state of affairs, as I find the Triumph people cannot undertake the overhauling of my machine as they are too busy on Government work.—C.V.

We should recommend you first of all to see that the relief valve is working properly. If this is obstructed the oil will be thrown out. The trouble might also be due to a worn main bearing, and might be temporarily remedied by inserting a felt washer between the crank case and pulley.

## Retaining the Old Number.

**?** (1.) Is it legal to transfer the registered number from one machine to another? In my case I want to take the number from a 3 h.p. Kerry and put it on a 2½ h.p. Douglas.—W.C.

Yes, it is quite legal to transfer your number from one machine to another, provided you have the permission of the registration authorities, and pay full registration fees. The registration of the machine for which the number was originally taken out must be cancelled.

## Transference of Insurance Policy.

**?** I have recently bought a 7.9 h.p. Harley-Davidson motor cycle and sidecar which had been insured by the late owner. Do you think it possible to have this policy transferred?—J.K.S.

We think there would be no difficulty about the transference of the insurance policy on your machine if you communicate with the broker or agent from whom the policy was originally obtained.

## The Lighting Regulations.

**?** (1.) What is the most powerful electric bulb one is allowed to use in a motor cycle head lamp?

(2.) Is the Restricted Lighting Order only for towns and villages?

(3.) Should I be within the law if I had a small, low candle-power electric lamp, with paper on the glass, for use in towns and villages, and then switched on to a powerful unscreened head lamp in the country? (4.) Where could I get the full Lighting Restriction Orders and information. (5.) In the event of a fog, is one allowed to have full lights on as before the war?—E.G.

(1-3.) In electric lamps the bulb must not exceed 12 watts or give more than 12 c.p., and there must be a sheet of white paper or a coat of white paint over the glass. You must not use unscreened head lights under any circumstances whatever. These regulations apply to all England except certain towns on the East Coast, where more drastic restrictions are in force. (4.) You may get the lighting regulations, price 1d., by applying to Messrs. Wyman and Sons, Ltd., 29, Bream's Buildings, Fetter Lane, London, E.C.4. (5.) We may tell you that if you used an unscreened light in a fog you would be worse off than with a light which is dimmed. Long before the war it was the practice of people overtaken by fog to tie a white handkerchief in front of the head light glass.



**Running on Substitute.**

**?** I have a 1917 Allon two-stroke, with which I have had no trouble until I tried to run on petrol substitute. At first I started up after petrol injections, but lately have been unsuccessful. I tried wrapping the carburetter in rag dipped in very hot water and attempting to revolve the engine rapidly, but with little success. Is there any way out of the difficulty—such as fitting a small tank for petrol with which to start, or else using a paraffin vaporiser?—G.B.

The trouble is probably due to the fact that the weather is colder now. You must start up first of all on petrol by fitting an auxiliary tank. When once the engine is warm, the petrol may be turned off, and you can continue to run on the substitute.

**Using Coal Gas.**

**?** (1.) What is the difference between coal gas and gasolene? (2.) Can gasolene be obtained locally? (3.) How far would a gasbag 15in. in diameter and 30in. in length carry me if filled with coal gas under slight pressure? (4.) What pressure would be safe and advisable? (5.) I intend running solo, with a gasbag fixed on the carrier. (6.) What alterations should I require to make my B. and B. carburetter suitable for coal gas? (7.) Would the gaspipe coupled to the usual jet do? (8.) Would a carburetter be necessary, as I presume the float chamber would be no good? (9.) Do you advise a fabric gas container; and if so, to what pressure could it be safely filled, and how far would one, say, 2ft. long x 6in. x 12in. run the machine? (10.) Should I be easily able to obtain a refill of gas at any town where gas was generated? (11.) Should I require to fit a pressure gauge to the gasbag? (12.) Would the gas go into and fill a gasbag enough, without pumping, from any ordinary gaspipe in town? (13.) How long would it take to fill it in this way, and how much would it cost? (14.) Would my engine develop the same, or more, power? (15.) Is coal gas quite safe to use on a motor cycle engine? (16.) Could the engine completely empty the gasbag of its own accord; I mean without the gasbag being pressed down as the coal gas was used? (17.) Would the change of pressure of gas as bag was emptied make much difference to the running of the engine; and if so, how much? (18.) In what way would the speed of the engine be controlled?—R.P.

(1.) Coal gas is ordinary household gas used for lighting, while gasolene is simply the American name for petrol. (2.) Gasolene is petrol. (3.) A gasbag 15 x 30in., with careful handling, might possibly run you something under one mile. (4 and 5.) Safe pressure depends entirely upon the material used and the construction of the bag, but probably 2 or 3 lb. above atmospheric would be the limit, and the bigger the bag the less pressure it would stand. (6.) Practically none. (7.) No, the jet would be too small. (8.) The gas can be introduced at the air intake, and the float chamber, of course, would not be required. (9.) Undoubtedly a fabric gas cylinder would be better, but

this cannot be obtained at the present time. (See *The Motor Cycle* for October 25th, page 398.) (10.) Yes, if you use an ordinary gasbag; but you could not get gas inserted into the cylinder under pressure, as so few pressure plants are available. (11.) A gauge would not be necessary in this instance. (12.) Yes, an ordinary gaspipe would do. (13.) This depends entirely upon the size of the feed pipe used for filling the gasbag. (14.) Your engine would develop approximately the same power if the mixtures were correct. (15.) Coal gas is quite safe. (16.) Yes. (17.) We do not think so. (18.) By means of the throttle or by means of a tap on the gaspipe.

**Paraffin and Acetylene.**

**?** Re article recently appearing in *The Motor Cycle* by R. G. Howard, A.C.G.I., B.Sc., as to acetylene dissolved in paraffin: (1.) Does this mean petroleum lighting oil? (2.) How is the paraffin saturated with acetylene gas? Is the carbide merely dropped into the oil, or is the gas generated and purified before saturation? (3.) Would it be feasible to warm up on coal gas and then run on petroleum? My machine is a side-car Scott with Binks two-jet carburetter.—H.K.

(1.) The paraffin referred to in the article in *The Motor Cycle* of October 4th is ordinary commercial paraffin, as bought at any oil merchant's. It is sometimes referred to as petroleum lighting oil, but paraffin or kerosene is the generally accepted name. (2.) The saturation of the paraffin with the acetylene gas is achieved by introducing the gas into the paraffin. Introducing carbide into the paraffin would have no effect whatever. (3.) It should be quite possible for you to warm up your engine on coal gas, and then run on ordinary lamp oil.

**Difficult Starting.**

**?** My mount is a 3½ h.p. T.T. Triumph. On a recent occasion I failed to start the engine, although I checked and examined everything. The only thing which will make it start is beating the plug over a gas jet and quickly screwing it home in the cylinder, when it starts readily, and continues to run and to start so long as it is not allowed to cool. Considerable heat is necessary. I have to adopt this plan every time. In your opinion, is the cause simply bad carburation (I use petrol with which to experiment) or some weakness in the magneto which is non-effective when the plug is heated? When cold I tested it, and the spark was apparently very weak.—G.W.S.

The cause is bad carburation and the indifferent petrol of the present abnormal time. The only remedy is to exclude as much air as possible when you start. Sometimes it is beneficial to plug up the fixed air inlet so that a stronger mixture is obtained at starting. Have you tried injecting petrol through the compression tap? Of course, if the magneto is really defective, the starting might be improved if the magnets were remagnetised, but it is very rarely that the magneto gives any trouble on a modern machine.

**Carburetter Blow-back.**

**?** I have a 1916 2½ h.p. three-speed Douglas. It is fitted with the ordinary Douglas carburetter. When the air is about a quarter open there is a blow-back through the air inlet. The petrol consumption is as high as fifty miles to the gallon. Is the blow-back wholly the cause of this? Please tell me how to check the blow-back and how to reduce the petrol consumption.—D.R.T.

The blow-back may be the cause of your trouble, and it looks as if stronger inlet springs were necessary. Have you tried a smaller jet? Weak inlet springs and too large a jet would account for the trouble.

**Licence Queries.**

**?** I have a 3½ h.p. Humber in London, and about two months ago I broke the big end, and the machine is in pieces, and I doubt if I shall use it again. At Coventry I have a 3½ h.p. Triumph which I have been riding some time. The question is: (1.) Will the Inland Revenue licence of £1 do for the Triumph, or shall I have to obtain another? (2.) Must I inform the County Council if I decide not to ride the Humber again?—C.S.

If you have laid up your Humber motor cycle, and have not at any time run the two machines contemporaneously, one Inland Revenue licence will suffice. In order to put yourself on the safe side, it would perhaps be as well to inform the Surrey County Council that your Humber motor cycle is not in use.

**RECOMMENDED ROUTES.****FARNBOROUGH TO BLACKPOOL.—J.H.**

Farnborough, Blackwater, Eversley, Arborfield, Reading, Stratley, Wallingford, Dorchester, Oxford, Chipping Norton, Moreton-in-the-Marsh, Evesham, Worcester, Kidderminster, Bridgnorth, Wellington, Hodnet, Whitchurch, Tarporley, Warrington, Newton-le-Willows, Wigan, Preston, Lytham, Blackpool.

**EPSOM TO CARK.—J.R.**

Epsom, Surbiton, Hampton, Staines, Windsor, Slough, Beaconsfield, High Wycombe, Stokenchurch, Wheatley, Islip, Bletchington, Chipping Norton, Moreton-in-the-Marsh, Evesham, Worcester, Kidderminster, Bridgnorth, Wellington, Whitchurch, Tarporley, Warrington, Newton-le-Willows, Wigan, Preston, Lancaster, Carnforth, Milnthorpe, Leven Bridge, Lindale, Grange, Cark.

**BIRMINGHAM TO ILFRACOMBE.—F.M.P.**

Birmingham, Bromsgrove, Droitwich, Worcester, Tewkesbury, Gloucester, Frocester, Stone, Bristol, Redhill, Highbridge, Bridgwater, Williton, Dunster, Porlock, by the tollgate road to the top of Porlock Hill, Lynmouth, Lynton, Paracombe, Combe Martin, Ilfracombe. Return *via* Barnstaple, South Molton, Bampton, Taunton, Durston, Glastonbury, Wells, Chewton Mendip, Bath, Nailsworth, Stroud, Painswick, Cheltenham, Winchcombe, Evesham, Alcester, Studley, Birmingham.



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# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd.,** and crossed **& Co.**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**A** BINGDON King Dick, 1914, 4h.p., 3-speed, fast machine. 25 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (1144)

### A.J.S.

**19** 16 A.J.S., 3 speeds, complete, lamps, horn, etc.; 248.—Cross, Agent, Rotherham. (X8142)

**A** J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. (9688)

**C**ROW Bros., Guildford.—A.J.S., latest 6h.p., just arrived, detachable wheels, green finish. (1049)

**A** J.S., 2½h.p., 2 speeds, 1912, good tyres, splendid condition; £15.—G. Hayes, 29, Port Hill Gardens, Shrewsbury. (X8035)

**19** 17 4h.p. A.J.S., sidecar, spare wheel, etc., £100; also 1916 6h.p. A.J.S. solo, 70 gns.—Bousfield, Westbury, Wiltshire. (X8084)

**A** J.S. 6h.p. Combination, 1914½; £56, or nearest; perfect mechanical order.—Townsend, Chapel Farm, Crick, Rugby. (X8110)

**A** J.S. 4h.p. Combination, 3-speed, late 1915, lamps, horn, complete; £80; not done 2,000.—Pickering, Mardol, Shrewsbury. (X7741)

**A** J.S., 6h.p., and sidecar, one of the last 1915 models turned out; price only 85 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. (9961)



to consider EVANS' fine selection—note his prices for the master models—remember his special payment terms, liberal exchanges, and prompt deliveries

Just stop to read this list—

CONNAUGHT, 2½ h.p., 2-st. £28 17 6  
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ENFIELD Combination ..... 90 gns.

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JAMES, 4½ h.p., 3-speed, complete with Sidecar ..... £99 0 0

JAMES, 3½ h.p., 3-sp., twin ..... £79 0 0

JAMES, 3½ h.p., 3-sp., twin, T.T. type ..... £79 0 0

JAMES, 2½ h.p., 2-sp., 2-st. .... £50 0 0

NEW IMPERIAL, 2½ h.p., 2-speed ..... £40 19 6

NEW IMPERIAL, 2½ h.p., clutch ..... £48 6 0

NEW IMPERIAL, lady's ..... £50 8 0

ROVER, 3½ h.p., countershaft 3-speed ..... £80 0 0

ROVER, 3½ h.p., Sidecar Combination ..... £106 5 0

ROVER, 3½ h.p. T.T., with hand-cont'd Philipson pulley ..... £67 10 0

ROVER, 3½ h.p. T.T., with out Philipson pulley ..... £62 10 0

ROVER, coachbuilt sidecar ..... £26 5 0

ROVER, 5-6 h.p. Twin ..... £97 10 0

ROVER, 5-6 h.p. Twin, with coachbuilt sidecar ..... £124 5 0

CALTHORPE-J.A.P., 2-speed... £39 18

CALTHORPE, lady's, 2-speed... £37 16

CALTHORPE, 3½ h.p., coach Combination ..... 72 gns.

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## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**4** h.p. A.J.S., late 1915, little used and carefully looked after, all accessories and spares in fine condition; £50.—Box LS.017, c/o The Motor Cycle. (102)

**A** J.S., latest 1917 6h.p. war models; immediate delivery; also 1915 2½h.p. model, first-class condition, complete, £50.—Parker's, Bradshawgate, Bolton. (X8184)

**19** 16 6h.p. A.J.S., in perfect running order, engine, gears, and transmission in very good order, Dunlop extra heavy tyres; £60.—Chapman, 42, Duke St., Norwich. (X8082)

**A** J.S., 2½h.p., 1914, 3-speed, clutch, T.T. bars, head lamps, generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.1. (1109)

**THE** Loudoun Garage, 77, Regent's Park Rd., N.W.—1916 A.J.S. 6h.p. combination, fitted with spare wheel, lamps, horn, hood, screen, oversize tyres on back wheel, condition as new; 105 gns. (1101)

**A** J.S., 1916 (June) 6h.p. Combination, fitted with spare wheel and tyre, hood, screen, Lucas lamps, Cowey speedometer, Stewart horn, mileage 3,500, first-class condition throughout; £95, lowest.—Box 1,400, c/o The Motor Cycle. (X8067)

**19** 16 A.J.S. de Luxe Combination, 3-speed, clutch, kick start, Gloria coach sidecar, hood, screen, luggage rack, detachable wheels and spares, 3 lamps, horn, tools, etc., in new condition; 89 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) (1143)

### Alldays.

**C**OLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. (0796)

**19** 15 Alldays Allon, 2½h.p.; £19.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. (0491)

**19** 15 Alldays Allon, 2-speed, clutch, kick starter, original tyres on; £32.—Missin, Cottesingham Hull. (X8183)

**A** LLDAYS, 1915, 4h.p., 2-speed, clutch; 24 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) (1145)

**A** LLOD, 2½h.p., 1917, 2-speed, clutch, as new, horn, lamps, etc.; £40, or best offer; bargain.—Blackham, Chemist, Oldbury, near Birmingham. (X8120)

**19** 14 3½h.p. Alldays Matchless, 2-speed Roe gear, handle start, coachbuilt sidecar, in splendid condition; sacrifice £28; no petrol; neat turnout, Binks carburettor.—Park, 39, Lister St., Hull. (X8158)

**A** LLOD (new), 2½h.p., 2-stroke, all models in stock for immediate delivery; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. (1115)

### Ariel.

**C**ROW Bros., Guildford.—Ariel, latest 3½h.p., 3-speed countershaft models in stock. (1048)

**C**OLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for Ariel motor cycles. (0797)

**3** 1½h.p. Ariel, 2-speed Bowden countershaft; £25, or exchange for lightweight.—34, West St., Crewe. (1045)

**A** RIEL, 3½h.p., 1913, adjustable pulley, good tyres, horn, spares, A1 condition; £18.—Knight, 29, John St., Barrow. (9971)

**3** 1½h.p. Free Engine 1912 Ariel, lamps, etc., perfect 32 order, not used for two years; £16.—2, St. John's Terrace, Kingston Vale, Putney. (1041)

**19** 14 3½h.p. 3-speed Countershaft Ariel, with C.B. sidecar, perfect condition, lamps, speedometer; only £45.—Parker and Son, St. Ives, Hunts. (9955)



## MOTOR CYCLES FOR SALE.

## Ariel.

1912 Ariel, 3½ h.p., variable pulley, Bosch, B. and B., decompressor, Dunlops, excellent running order; first £17 secures.—Hill, 6, Cozens Rd., Norwich. [9956]

ARIEL (new), 3½ h.p., 3-speed countershaft gear, clutch, and kick-start, decompressor, patent spring seat pillar; £72; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1116]

FIRST Cheque Secures.—1914 3½ h.p. T.T. Ariel, with Phillips pulley, hand-controlled, £55, tyres and belt new; 1914 2 h.p. 2-speed Champion, £12, in topping condition; 1914 3 h.p. Royal Enfield, 2-speed, cylinders just been rebored, new bushes, engine still in box, never been assembled, some new parts, £25; 1911 Triumph, 3½ h.p., new back tyre and belt, engine in top-hole condition, £18; 1914 7-9 h.p. Indian and sidecar, 2-speed, clutch, in fine condition, £55; 1916 3½ h.p. 3-speed Premier, sidecar, coachbuilt, £48.—Billy Grindley, The Garage, T'rees, Salop. [X8107]

## Auto-Wheels.

AUTO-WHEEL, Raleigh combination, nearly new, splendid condition; bargain, £14, nearest offer.—R. Klaber, Shortlands House, Shortlands. [9981]

## Bat.

8-10 h.p. Bat-Jap Combination; £45, or exchange for a good P. and M.—Horsley, Bank Row, Garforth, Leeds. [X8068]

BAT-J.A.P., 6 h.p. twin, 2-speed, with sidecar; 21 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1164]

1912 Bat-Jap 4 h.p. Combination, spring frame, Bosch, B. and B., P.M. countershaft, fast, powerful; £18/10.—Hill, 6, Cozens Rd., Norwich. [9957]

1911 4 h.p. Bat-Jap, spring frame, take sidecar, overhauled; £18; exchange 12 bore double barrel hammerless and cask.—Hammond, 44, Beck Rd., Chester. [1011]

## Bradbury.

3 h.p. Bradbury, good condition throughout; £7.—Deamont, 16, George St., Thurston, Rotherham. [9990]

1914 Bradbury and Sidecar, N.S.U. 2-speed, good condition; £25, no offers.—W. G. Fuller, 38, Ash Grove, Cricklewood. [1017]

BRADBURY, 1914, 2-speed countershaft gear, clutch, kick start, with underslung coachbuilt sidecar; 39 gns.; would separate.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1146]

1914 Bradbury Combination, 6 h.p. twin, countershaft 3-speed, h.b.c. clutch, Bosch waterproof mag., completely overhauled, engine rebushed throughout, Bradbury coachbuilt De Luxe model sidecar, Easting patent wind screen, 650x65 tyres, 3 lamps, horn, appearance equal to new; £50.—The Premier Motor Co., Aston Rd., Birmingham. [1090]

## Brough.

£48 secures 3½ h.p. Brough, 3-speed (1916).—Reid, Whyte St., Lochgelly, Fife. (D) [X7916]

## B.S.A.

COLMORE Depots 261, Deansgate, Manchester, for quickest delivery of B.S.A. [0798]

1914 3½ h.p. B.S.A., chain-cum-belt, done 4,000 miles only, guaranteed perfect; £42.—Missin, Cottingham, Hull. [X8180]

1915 4 h.p. B.S.A., 3-speed countershaft, lamps, speedometer; best offers.—Parker and Son, St. Ives, Hunts. [9936]

1917 B.S.A., 4½ h.p., chain-cum-belt, with 1917 Mills-Fulford sidecar, speedometer, lamps, spare valve, etc.; £68.—Clayson, Midland Rd., Wellingborough. [6156]

B.S.A., 4½ h.p., all chain, brand new 25 gns. sidecar, only done 20 miles; £90, close offer; lamps, horn, etc.; must sell.—Short, 485, Upper Richmond Rd., East Sheen. [9960]

1916 B.S.A. 4½ h.p. Model K, chain-cum-belt, fully equipped, very little used; £45, no offer.—C. Cannon, New Tree Cottage, High Rd., Hayes, East Middlesex. [X8088]

1916 B.S.A., 4½ h.p., all chain drive, and coachbuilt sidecar, hood, wind screen, speedometer, lamps, horn; £65; perfect condition.—Martin, 104, Bingham Rd., Croydon. [9966]

B.S.A., 1915, 4½ h.p., chain belt, 3-speed, Phoenix coachbuilt sidecar, speedometer, lamps, new Dunlop on back, in thorough good order; £55.—Box L5,022, c/o The Motor Cycle. [1094]

1917 B.S.A., 4½ h.p., chain-cum-belt, complete with lamps, horn, speedometer, etc., new condition, and in perfect order; £55, no offers.—Eveling, Heywood, Albany Rd., Salisbury. [1056]

1917 B.S.A., all chain, Canoelet sidecar, horn, lamps, generators, cape; cost £92 Christmas; in perfect running order; £65, or nearest offer.—Honeywill, 10, Orwell Place, Ipswich. [X8139]

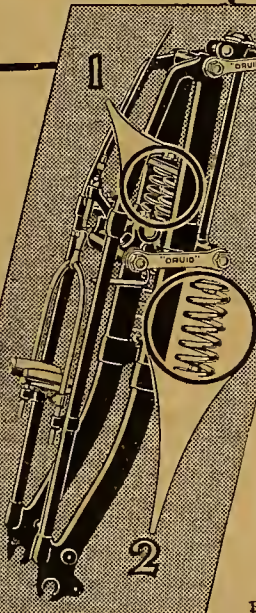
1915 B.S.A. Model K, Canoelet sidecar, wind screen, luggage grid, 3 Lucas lamps and generators, Stewart trip speedometer, tyres nearly new, smart outfit; £62.—Geo. Hyde, Stoneyford, Aunscoft, near Shrewsbury. [X8079]

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B.H.S.

## MOTOR CYCLES FOR SALE.

## B.S.A.

LATE 1915 4½ h.p. B.S.A. Combination, all chain drive, 3-speed countershaft gear, B.S.A. No. 2 sidecar, Lucas head and sidecar lamps, also Lucas horn, all the above in 1916 condition; bargain, £55.—Joe Gardner, West Cornforth, Durham. [9979]

B.S.A., 1917, 4½ h.p., chain-cum-belt, 3-speed, clutch, kick start, absolutely as new, with Montgomery coachbuilt sidecar to match, 62 gns.; would separate; 1915 B.S.A., 2-speed and clutch, 27 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1147]

## Calthorpe.

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799]

1915 2½ h.p. Calthorpe-Jap, Ebfield gear, exceptional condition; £26.—30, Manchester St., Oldham. [1054]

1916 2-stroke Calthorpe, 2-speed, perfect, accessories, as new; only £30.—Parker and Son, St. Ives, Hunts. [9937]

CALTHORPE, 1917, 2-speed, 2-stroke, as new; 29 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1148]

## Clement.

CLEMENTS 1½ h.p. Motor Cycle, accumulator ignition, take 14 stone anywhere, good running order throughout; £4/10.—321, Edgware Rd., W. [1120]

## Clyno.

CLYNO War Office Combinations for early delivery from Colmore Depots, Birmingham and Manchester. [0884]

CLYNO 6 h.p. Twin, 2-speed, clutch, kick start, fully equipped; 25 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1149]

CLYNO 1913-14 Combination, 6 h.p., 3-speed countershaft gear, all chain, interchangeable wheels, excellent condition; bargain, £62, no offers.—Kirby, Prospect House, West Cornforth, Co. Durham. [X7917]

## Connaught.

CONNAUGHT, 1916, 2-stroke, complete with head lamp, generator, rear lamp, horn, etc., only done small mileage; bargain, £26.—Advertiser, 156, Gt. Portland St., W.1. [1110]

## Douglas.

I CAN Supply You with a 1917 Douglas.—J. Gonrly, Fallowfield, Manchester. [9858]

2 h.p. Douglas, 1914, perfect condition; £30.—Gant, 24, 26, Greenholm Rd., Eltham, S.E.3. [1029]

DOUGLAS, 1914, 1915, 1916 in stock, many others.—Griffiths, 89, Gt. Portland St., W.1. [9964]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, 1914, 2-speed, magnificent condition; 36 gns.—Julians, 84, Broad St., Reading. Phone: 1024. [9927]

DOUGLAS, 1916, 2½ h.p., 2-speed, fitted with lamps, horn, almost new; £45.—Hebden's, 149, St. James' St., Burnley. [1075]

THE London Garage, 77, Regent's Park Rd., N.W.—1914 Douglas, 2½ h.p., fully equipped, tip-top condition; 37 gns. [1104]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

DOUGLAS, 2½ h.p., May, 1916, mileage about 1,500, 3-speed, clutch, kick start, as new.—Box 1,402, c/o The Motor Cycle. [X8081]

DOUGLAS Motor Cycle, 1910, 2-cyl., overhauled and enamelled; £15.—Apply, A.M.E. Co., 1, Eltham Rd., Lea Green 707. [9976]

COLMORE Depots, Birmingham, Manchester, and Liverpool, and Leicester, for earliest delivery of Douglas motor cycles. [0800]

DOUGLAS, 1914, T.T., 2-speed, service grey, new Anne; 34 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1150]

4 h.p. Douglas and underslung cane sporting sidecar, 2-speed, good condition; £46, quick sale; exchange.—136, Lavenham Rd., Southfields. [1122]

DOUGLAS, 1914, 2½ h.p. T.T., 2 speeds, accessories, excellent condition, very powerful; £35.—Captain Kellar, 34, Welbeck Av., Southampton. [X8027]

DOUGLAS, 2½ h.p., late 1913, 2-speed, head lamp, Dunlop tyres, in good condition; £31; must sell.—Hyams, 47a, Picton St., Camperwell. [9965]

DOUGLAS, 1916, 2½ h.p., 3-speed, run 2,000 miles, speedometer, mechanical horn, tools; £50.—Burdorf, 12, York St., Baker St., London. [1013]

1914 Douglas, 2-speed, overhauled, splendid condition, tyres as new, lamp, etc., very fast; £40.—L. G. Eldridge, 10, West End Lane, Kilburn, N.W.6. [9950]

DOUGLAS.—Prompt delivery of new models to doctors, farmers, etc., against Ministry of Munitions permit.—Motor Exchange, Horton St., Halifax. [1001]

DOUGLAS, 1912, 2½ h.p., 2 speeds, lamps, speedometer, new tyre and John Bull belt, accessories, clutch and kick start, needs little adjusting; £25, or near offer.—C/o 9, Australia Rd., Slough. [9972]



## MOTOR CYCLES FOR SALE.

## Douglas.

DOUGLAS, 1915, T.T., 2½ h.p., 2-speed, just overhauled, perfect order, lamps, horn, speedometer; £38/10.—Haslett, 106, High St., Bexley. [1032]

DOUGLAS, 1913, 2 speeds, Bosch, cylinders rebored and new pistons fitted, unused since, splendid condition; £27.—Stratton, Mount Pleasant, Redditch. [1067]

DOUGLAS, late 1912, 2-speed, kick and clutch, in good condition, speedometer, lamps, etc., tyres perfect; £50.—Stonham, 5, Home St., Frindsbury, Rochester. [1943]

1915 2½ h.p. Douglas, 2-speed, touring bars, foot-boards, Amac, 2 lamp sets, horn, Brooks case, excellent condition; £45.—Robinson's Garage, Green St., Cambridge. [1062]

1916 T.T. Douglas, 3-speed, splendid condition throughout, knee-grips, 2 lamps, mechanical horn, touring and T.T. handle-bars, new belt; £42.—B. Roberts, Grocer, Windsor. [1944]

DOUGLAS Motor Cycles.—We can deliver 1917 Model W on receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol (Wholesale and retail.) [923]

2½ h.p. Douglas, absolutely new; immediate delivery of 24 models U, V, and W clutch, kick start, against priority permits for doctors, farmers, war and munition workers.—How and where to apply, for full particulars write the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [1060]

1915 Douglas, 2½ h.p., 3-speed Model V, new September, 1915, guaranteed sound, complete with tools, electric tail and head lamp, or acetylene head lamp, Winford speedometer, Stewart horn, done nearly 4,000 miles, examination and trial any day by appointment, all black finish, good tyres; £45, or nearest offer.—Box L5,018, c/o The Motor Cycle. (D) [9994]

## Edmund.

EDMUNDS (new), 2½ h.p. J.A.P. Royal Enfield 2-speed, spring frame, double tank, strongly built machine; £54/12/6; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1117]

## Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3 h.p. Twin, £57/10; and 2½ h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838]

ENFIELD, 2½ h.p., just thoroughly overhauled, including lamps; £50.—Dents', Stonegate, York. [1025]

ENFIELD, late 1916, 3 h.p., 2 speeds, kick start; £47.—Riches, Customs and Excise, Peterborough. [X8191]

ENFIELD, 1917, 3 h.p., not done 300 miles, economical, lamps, horn.—Lieut. Lowles, Swedish War Hospital, W.1. [X8121]

ENFIELD, 3 h.p. twin, 1916 model, practically equal to new; 40 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [9928]

1915 6 h.p. Enfield Combination, electric lamps, numerous spares, absolutely sound; £75.—Farrar's Motories, Hopwood Lane, Halifax. [9668]

ENFIELD Combination, 1916, mileage 2,000, in splendid condition, and guaranteed perfect; 75 gns.—280, Camberwell Rd., S.E.5. [9991]

THE London Garage, 77, Regent's Park Rd., N.W.—1917 6 h.p. Enfield combination, fully equipped, and condition exactly as new; 89 gns. [1105]

ROYAL Enfield, 3 h.p. twin, 1917, run 500, as new, easy starter fixed, all accessories; £55.—F. W. Matthews, Phant Farm, Etwick, Beds. [9958]

ENFIELD, 1916, 2½ h.p., 2-speed, fitted with lamps, horn, and speedometer, guaranteed as new; £52.—Hebden's, 149, St. James' St., Burnley. [1076]

1915 6 h.p. Royal Enfield Coach Combination, Bosch, in splendid condition, and plenty spares; bargain, £63.—A. Morris, 85, Lodge Lane, Hyde, Cheshire. [X8096]

ROYAL Enfield 6 h.p. Combination, fitted with 3 lamps, horn, speedometer, unscored, not run 600 miles, guaranteed as new; £85.—Hebden's, 149, St. James' St., Burnley. [1074]

ENFIELD, 6 h.p., late 1914, 2-speed, handle starter, good tyres, coachbuilt sidecar, head lamp, generator, rear lamp, fully equipped, and perfect throughout; bargain, £45.—Below.

ENFIELD, 2½ h.p., 1914, 2-speed, kick starter, all chain drive, Enfield grey, good tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout; bargain, £32/10.—Mebes and Mebes, 156, Gt. Portland St., W.1. [1108]

ENFIELD, 6 h.p., 1916-17, low mileage, all lamps, Lucas horn, tyres practically new, wind screen to sidecar; 80 gns.—Apply, Lawrence, Escella Works, Heatherley St., Evering Rd., Stoke Newington, N.16. [9946]

ENFIELD 3 h.p. Twin, 1916, June model, in altogether exceptional condition, speedometer, lamps, horn, very small mileage, and in every way like new; £45.—94, Gloucester Rd., South Kensington, S.W. [9939]

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WE HAVE FOR SALE THE FOLLOWING COMBINATIONS AND SOLO MOUNTS AT BARGAIN PRICES.

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A.J.S., 6 h.p., 1914, 3-speed, kick start, chain drive, perfect condition.

DOUGLAS, 1915, 4 h.p., 2-speed, kick start, complete with Burberry Sidecar.

EXCELSIOR, 1915, 8-10 h.p., dynamo lighting, 3-speed, kick start, complete with sporting Sidecar.

CLYNO, 1914, 6 h.p., 3-speed, kick start, interchangeable wheels, special 5-point Sidecar.

## SOLO MOUNTS.

RUDGE, 3½ h.p., Lucas head lamp and generator, speedometer, in first-class condition.

DOUGLAS, 3½ h.p., 1914, 2-speed, Bosch magneto, P. and H. head lamp and rear light.

SCOTT, 1914, 3½ h.p., Lucas head lamp, Stewart speedometer.

RUDGE, 3½ h.p., Multi model, Senspray carburettor, C.A.V. magneto.

ENFIELD, 2½ h.p., chain drive, Grado gear, finished khaki.

LUGTON, 3½ h.p., B. and B. carburettor, in fine condition.

REX, 1913, 3½ h.p., 2-speed, handle starting; ready for the road.

CALTHORPE, 1915, 2-stroke, 2-speed, Dixie magneto, in good condition.

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1916 VINDEC SPECIAL, 2-stroke, 2-sp. £29 0  
1915 INDIAN, 7-9 h.p., spring frame and Hendee Sidecar, electric equipment £68 0  
1915 NEW IMPERIAL J.A.P., 2-speed. £27 10  
1915 IVEY, 2-stroke ..... £18 0  
1914 MATCHLESS 8B Combination, hood, screen, all accessories, spares £70 0  
1914 B.S.A., 4½ h.p., chain drive, and B.S.A. Sidecar, hood, screen .... £55 0  
1914 LINCOLN-ELK, C.B. Sidecar ... £38 0  
1914 PREMIER, 3-sp., C.B. Sidecar .. £46 0  
1913 ENFIELD, 6 h.p., C.B. Sidecar .. £46 0  
1913 ZENITH, 6 h.p., clutch model .. £35 0  
1913 PREMIER 2-speed Combination .. £35 0

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## MOTOR CYCLES FOR SALE.

## Enfield.

ENFIELD 1915 Combination, 6 h.p., excellent condition, low mileage, Binks carburettor, Lucas lamps, horn, Bosch mag., Dunlop combination back tyre; 70 gns.—E. S. Bloomer, Fox Oak St., Cradley Heath. [X8082]

ENFIELD Late 1914 Combination, Stewart speedometer, horn, mirror, screen, 3 lamps, good tyres, low mileage, all in fine condition; £60.—Albert Steam Works, 188, Crampton St., Wolverth, S.E., or appointment. [9947]

ENFIELD 6 h.p. 1916 Combination, Palmer cord light car tyres all round, large head lamp, generator, rear lamp, luggage carrier to sidecar, very nice condition throughout, and fully equipped; £82/10.—Advertiser, 156, Gt. Portland St., W.1. [7904]

ENFIELD 1917 Combination, 3 in. tyres, many extras, Bosch mag., fully equipped, 82 gns.; also 1916 standard Enfield combination, 77 gns.; also 1916 Enfield, 2-stroke, 29 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1151]

1917 Model 6 h.p. Enfield Combination, Cowey speedometer, acetylene and electric lamps, luggage carrier, screen, Lucas horn, tools, in first-class condition; £88; will meet prospective buyer at Brentwood Station and give trial.—Rector, Great Warley, Essex. [1014]

ROYAL Enfield, 3 h.p., purchased last month, practically brand new, run about 100 miles, with smart sidecar, etc.; inspection and trial here; sole reason for selling, owner cautioned against riding by doctor; cost £77, will accept £67.—Baronet, Willow Lodge, Hungerford. [X8028]

ENFIELD 1916-17 6 h.p. Dynamo Combination, hood, screen, speedometer, 105 gns.; also 1916 ditto, £105; also 1916 standard model, sold new May, 1917, with hood, screen, speedometer, quite like new, ridden only 300 miles, £115; also 1917 3 h.p. solo, with 6 g.n. speedometer, Lucas lamps, horn, £63; also 1914 6 h.p. combination, condition perfect; also 1916 6 h.p. combination, with all accessories, beautiful condition, £78/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9997]

## Excelsior.

ENGLISH Excelsior Motor Cycle, 3½ h.p., Bosch, B. and B.; £17, or near offer; seen Sunday only.—37, Bath Rd., Chiswick. [1028]

EXCELSIOR (American), 7-9 h.p., 3-speed, new last June, lamps, speedometer, spare tyre, specially fast machine, 90 m.p.g.; lightweight taken part exchange.—18, Bournbrook Rd., Birmingham. [X8164]

COAL Gas. Any combination equipped.—1914 British Excelsior, big single, 5-6 h.p., 2-speed, Montgomery sidecar, 42 gns.; solo, 35 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [9924]

AMERICAN Excelsior, Standard Model, 7 h.p., 3-speed, new March, 1917, special Montgomery coach-built sidecar, 3 lamps, horn, tools, etc., used for demonstration only; £80.—The Premier Motor Co., Aston Rd., Birmingham. [1088]

AMERICAN Excelsior New Model de Luxe, 7 h.p., 3-speed, dynamo electric lighting outfit, head lamp, tail lamp, electric horn, Stewart speedometer, etc., £85; special Louisa type sidecar to match, £20; delivery free to any address; immediate delivery.—The Premier Motor Co., Aston Rd., Birmingham. [9781]

## F.N.

F.N. Motor Cycle, 1910, 4-cyl.; £10.—Apply, A.M.E. Co., 1, Eltham Rd., Lee Green 707. [9975]

F.N., 2½ h.p., good condition, wants accumulator, good tyres; £4/10.—137, Loughborough Rd., Brixton, London, S.W. [1052]

1912 5-6 h.p. 4-cyl. F.N. Motor Cycle, free engine, Bosch waterproof mag., splendid order; £16/10.—Piddoux, Parade, Marvels Lane, Grove Park, S.E.12. [X8167]

## Harley-Davidson.

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for Harley-Davidsons. [0802]

HARLEY-DAVIDSON, latest khaki model combination, magnificent turnout; £130.—Parker's, Bradshawgate, Bolton. [X8186]

HARLEY-DAVIDSON Combination, late 1915, electric model, perfect condition, mileage 2,500; cash £63.—Cave, Decorator, Windsor. [1079]

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for Harley-Davidsons; P. and H. lamp sets, specially made for H.D.; £3/3, carriage paid. [9256]

THE London Garage, 77, Regent's Park Rd., N.W.—1916 7-9 h.p. Harley-Davidson, electrically equipped, everything on, top hole condition; 89 gns. [1102]

1916 Harley-Davidson Combination, 7-9 h.p. electric model, in perfect condition; £99/10.—Elee and Co., 15-16, Bishopsgate Av., Canonville St., E.C.3. [10552]

1916 Harley-Davidson Electric Model Combination, rooey sidecar, perfect order, good tyres; trial; £85.—Hawkes, 19, Pennard Mansions, Goldhawk Rd., W.12. [9953]

HARLEY-DAVIDSON Combination, 1916, H.D. sidecar, appearance almost new, Palmer cord tyres, Bosch mag.; price £80, or near offer.—Cook, 38, Blundford St., W. [1030]

HARLEY-DAVIDSON Electric Combination, new 1917, including hood, screen, apron, sidecar lamp, side curtains, speedometer, 2 horns, etc.; £135.—Lindhurst, 9, Douglas Rd., Canonbury. [X8150]



## MOTOR CYCLES FOR SALE.

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**THE** Most Distinctive and Luxurious Harley-Davidson combination possible, 1916 model 167, 7-9 h.p., 3 speeds, dynamo electric lighting outfit, head lamp, tail lamp, horn, sidcar lamp, special No. 3 Gloria spring wheel sidcar, with luggage carrier, petrol can carrier, 28x3in. tyre, etc.; present list price of complete outfit £135; mileage under 2,000, and guaranteed as new; £85 cash.—The Premier Motor Co., Aston Rd., Birmingham. [1089]

## Henderson.

**RIDER** TROWARD and Co., 31 and 78, High St., Hampstead.—1915 Henderson combination, disc wheels, good order; 79 gns.; can be equipped for coal gas. (D) [9913]

## Humber.

**HUMBER** Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0682]

**HUMBER** 3 1/2 h.p., 3-speed, 1914, lamps, etc., perfect order; £30.—Crabtree's Garage, Wisbech. [X8119]

**1914** 3 1/2 h.p. 3-speed Humber, lamp, etc.; £25, cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863]

**HUMBER** 3 1/2 h.p. Flat Twin Motor Cycles, four brand new latest models in stock.—Crabtree's Garage, Wisbech. [X8118]

**1917** (June) G.H.P. Humber Combination, speedometer, screen, Holsten electric lamps, 350 miles, unsold.—Wesley, Wentworth, Stanley Park Rd., Wallington, Surrey. [1027]

**HUMBER**, late 1913, 3 1/2 h.p., 3-speed, with Millford coachbuilt sidcar, Sturmer-Archer clutch, in good order and condition; owner joining up; must sell; reasonable offer.—A. C. Gould, 32, White Lion St., E.L. [1016]

## Indian.

**1915 1/2** Indian Combination, 20 gallons petrol; £62.—A. Wood, 153, Leymoor Rd., Golcar, Huddersfield. [X8188]

**1916** Powerplus Indian Combination, electric lighting, spring frame, T.T. bars, unscratched and as new; £98.—Below.

**1915** 5 h.p. Indian and Swan torpedo sidcar, fully equipped with lamps, horn, speedometer, finished throughout yellow; £45.—Below.

**1914** 7-9 h.p. Indian 2-speed, spring frame, and Millford chassis, lamps, speedometer; £38.—Elice and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492]

**INDIAN** 5 h.p. 3-speed Combination, fitted with 3 lamps, horn, speedometer, equal to new; £60.—Hadden's, 149, St. James' St., Burnley. [1077]

**INDIAN** 1915 7-9 h.p. Combination, 3 speeds, spring frame, electrically equipped, fast, powerful; £60, bargain.—Bowers, Naval Hospital, Portland. [X8146]

**7 1/2** h.p. Indian 3-speed Combination, wind screen, horn, and tools, late 1916, first-class condition, done under 1,000 miles, guaranteed faultless; £70.—26, Sholebrooke Av., Leeds. [X7918]

**7 1/2** h.p. Powerplus 1916 Indian Combination, spring frame, electric light, Montgomery sidcar, very small mileage, as new, one of the finest combinations on the road; £85.—Neale, Streetsbrook Rd., Solihull. [X7921]

**INDIAN**, 1915, 5 h.p., 3-speed, clutch, kick start, 39 gns.; 1915 T.T., 7-9 h.p., clutch, 39 gns.; 1913 Indian engine, 7-9 h.p., mag., and gears, cheap.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1152]

**INDIAN** Latest Model Powerplus Combination, magneto-dynamo lighting, T.T. bars, fully equipped, luxurious turnout, machine has been kept in stock awaiting owner's return; listed at £120, accept £98.—Parker's, Bradshawgate, Bolton. [X8187]

**1916** 7-9 h.p. Powerplus Indian Combination, spring frame, Millford coachbuilt sidcar, electrically equipped with 3 lamps and horn, perfect condition; £73, quick sale, no offers.—Write for appointment.—Crawford, Sunset, Pett, near Hastings. [9959]

**INDIAN** Powerplus 1916 7-9 h.p. 3-speed Combination, 73 gns., rare bargain; actually in stock; condition perfect, lamps, horn, speedometer; also late 1915 7-9 h.p. clutch model, plating and enamelling perfect, £55.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9998]

## Ivy.

**IVY**, 2 1/2 h.p., 2-stroke, lamps, horn, complete, scarcely soiled, perfect; £24/10.—Kirwin Evers, Yarnbrook, Trowbridge. [X8189]

**IVY**, 2 1/2 h.p., 2-stroke, single speed, splendid condition; £22.—Edwards, Triumph Works, Church Walk, Newington Green, London. [1083]

**4 1/2** h.p. 1916 T.T. Ivy-Jap, cost £60 in November, Bosch, Amac, new condition, all accessories, lamps, etc.; £40.—Lieut. Woodward, Worlingham, Beccles, Suffolk. [9945]

## James.

**COLMORE** Depot, 261, Densgate, Manchester, have in stock complete range of James motor cycles. [0803]

**JAMES** 1916 Combination, perfect, screen, 900 miles; £63, nearest 'Phone; Admiralty L.—Skinner, Elsie Villa, Lausdowne Av., Leigh-on-Sea. [1033]

**1915** 3 1/2 h.p. Twin James, 3-speed countershaft, speedometer, all accessories, semi T.T. bars; £36, going abroad.—Box L5,019, c/o The Motor Cycle. [1091]

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## MOTOR CYCLES FOR SALE.

## James.

**JAMES**, 1917, 4 1/2 h.p. twin, countershaft 3-speed, hand controlled clutch, kick starter, chain drive, speedometer, and lamps, perfect condition; £48.—Fryer, Aslockton, Nottingham. [X8099]

**JAMES**, the latest 1918 5-6 h.p. twin, actually in stock; also 1913 4 1/2 h.p. solo model, £22/10, with accessories; also 1916 No. 6 combination, with special silencer under sidcar, speedometer, lamps, and horn, £73, like new.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9996]

## Kerry.

**KERRY-ABINGTON**, 1912, 3 1/2 h.p., 2-speed, and clutch, coach sidcar; 25 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1163]

**TWIN** Kerry, 5 h.p., and cane sidcar, N.S.U. 2-speed, Bosch, B. and B., 3 lamps, spare belt, etc., in good running order; £22.—M., Thames Hotel, Windsor. [X8087]

## Lea-Francis.

**LEA-FRANCIS**, 1913 (November), 3 1/2 h.p. twin J.A.P. engine, 2-speed gear box, hand and foot clutch, all enclosed chain drive, in fine condition, recently fitted with new chains, sprockets, spring fork, and carburetter; price £45.—Apply, Dr. Fenton, Wincanton, Somerset. [X8098]

## Levis.

**COLMORE** Depots, Birmingham and Leicester, for delivery of Levis motor cycles from stock. [0804]

**LEVIS**, 2 1/2 h.p., 2-stroke, lamps, horn, spares, perfect order; owner joining up; 13 gns.—Tipper, Mill St., Brierley Hill, Staffs. [X8145]

**LEVIS** 1915 De Luxe, 2 1/2 h.p., 2-speed, 26 gns.; 1915 Popular, 2 1/2 h.p., 21 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1153]

## Lincoln-Elk.

**LINCOLN-ELK**, 3 1/2 h.p., variable gear, waterproof Bosch, good order and appearance, takes sidcar; 19 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1162]

## Martin.

**MARTIN-J.A.P.**, 3 1/2 h.p. T.T., overhead valves, very fast; 25 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1159]

## Matchless.

**MATCHLESS** Motor Cycles from stock at Colmore Depots, Birmingham and Manchester. [0881]

**MATCHLESS** 1917 War Model Combination; £120; delivery from stock.—Parker's, Bradshawgate, Bolton. [X8185]

**WE** can give immediate delivery of the war model Matchless; £120.—Elice and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0480]

**CROW** Bros., Guildford.—Matchless, 1915, 7 h.p. M.A.G., and Gloria sidcar combination, hood, screen, Watford, spares, lovely condition; £73. [1050]

**1917** Matchless War Model, new combination, khaki finish, £8 worth accessories; 117 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. [1154]

**MATCHLESS** 5 h.p. Combination, splendid condition, fully equipped; any trial you like; 35 gns.; fitted for trade purposes if desired.—Buntings, Masons Av., Harrow. [1069]

**THE** Loudoun Garage, 77, Regent's Park Rd., N.W.—Matchless, M.A.G., new war combination, 3-speed, clutch, kick start, 4 detachable wheels; the combination £125; exchanges or extended payments. [1103]

**MATCHLESS** (two) 1917 8 h.p. J.A.P. Combinations actually here, £120 and £125 respectively, spare wheels in both cases; easy payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [9995]

## Motosacoche.

**1916** Motosacoche, 3 1/2 h.p. twin, De Lissa valves, 2-speed Enfield gear, unscratched; 47 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1155]

## New Hudson.

**2 1/2** h.p. New Hudson, 2-stroke, 1916 model, 2-speed gear; £28, quick sale.—136, Lavenham Rd., Southfields. [1123]

**1916** New Hudson De Luxe Model Combination, 4 h.p., 3-speed countershaft gear, kick starter, accessories; £55; exchange.—136, Lavenham Rd., Southfields. [1121]

**NEW** Hudson, 1916, 2 1/2 h.p., 2-speed, 2-stroke, 27 gns.; 3 1/2 h.p. 1914 3-speed combination, 36 gns.; 6 h.p. 1915 3-speed combination, 55 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1156]

## New Imperial.

**BRAND** New 1917 2-speed New Imperial Lightweight; 39 gns.—Motor Exchange, Horton St., Halifax. [1002]

**CROW** Bros., Guildford.—New Imperial, latest 2 1/2 h.p., 3 1/2 h.p., 6 h.p. models in stock; also sound second hands. [1047]

**NEW** Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0859]



## MOTOR CYCLES FOR SALE.

## New Imperial.

1915 New Imperial-Jap, 2½ h.p., 2 speeds, accessories, good running order and condition; £23/10.—Gwynn, Vicarage, Sheringham. (D) [X8151]

NEW Imperial, 2½ h.p., 2-speed, good order, 25 gns.; 1917 lady's model, 2-speed, clutch, kick start, 37 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1157]

NEW Imperial (new), 2½ h.p., 2 speeds; £40/19; actually in stock for immediate delivery; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1114]

NEW Imperial 8 h.p. J.A.P. Overseas War Office Combinations, as described in detail pages 252-3, Sep. 13th issue of this paper, exceptional machine in every detail; immediate delivery from stock; £114/9.—Colmore Depot, Distributors, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [10886]

## Norton.

1916 T.T. Norton, done about 500 miles, perfect condition, complete; bargain, £50.—Dall, Barrow-in-Furness. [X8032]

## N.S.U.

HAVING Acquired the Entire Stock-in-trade of the N.S.U. Motor Co., Ltd., we can now supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Eagles and Co., Acton Hill Works, Acton, W.3. [X8149]

## O.K.

O.K. Juniors.—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn. [0910]

O.K. Junior, 2 h.p., 2-speed, excellent lightweight; 17 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1160]

O.K. Junior, 2½ h.p. J.A.P., 1917 model, 2-speed countershaft, Amag, E.I.C., Clinchers, Brampton forks, automatic drip feed lubrication, electric lighting, extra tank for substitute and hot air intake, 800 miles, and overhauled, engine and mag. spares, overalls; petrol given; £35, or near offer; ideal for commercial or war work.—Chamberlain, 55, Ruskin Walk, Herne Hill, S.E. [X8155]

## P. and M.

P. and M., 1911, 3½ h.p., 2 speeds, handle starting, chain drive, Bosch, good tyres, running order; £15.—321, Edgware Rd., W. [1119]

6 h.p. P. and M. Combination, 90° twin engine, P. and M. coachbuilt sidecar, speedometer, etc., fine turn-out; £75.—Farrar's Motorcycles, Hopwood Lane, Halifax. [19037]

P. and M., 3½ h.p., P. and M. sidecar and wind screen, all accessories, splendid condition, been under 5,000; ten miles N. London; £65.—Box L5,012, c/o The Motor Cycle. [1021]

FOR Sale, P. and M. motor cycles, 3½ h.p., 1914 and 1915 models, 2-speed, chain driven, together with delivery van mounted on sidecar chassis, in good running order, good mileage results, average being 60 m.p.g.; invaluable for delivery work of all kinds.—For fuller particulars apply, Box 1,406, c/o The Motor Cycle. [X8112]

## Peugeot.

PEUGEOT, 6 h.p. twin, Bosch mag., B. and B., new saddle, handle-bars, Dunlop belt, etc., just overhauled, rebushed, new rings, etc., less tyres and tubes; £14, offers.—Lewis, William St., Youghal, Cork. [X8038]

## Portland.

PORTLAND-J.A.P., sidecar, 6 h.p., B.S.A. gear box, clutch, kick start, perfect order; £42.—Capt. Lagard, 76, Carlton Mansions, Maiden Vale. [9982]

## Precision.

PRECISION, 1914, 4 h.p., 3-speed, perfect, 24 gns.; 1914 4 h.p. clutch model, 19 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1159]

1913 Precision, 3½ h.p., single speed, 2-stroke, lamps, horn, in good running order, 18 gns.; also 3½ h.p. Olympic.—A. Burchell, 78, Fairmont Rd., Grimsby, Lincolnshire. [X8069]

## Premier.

3½ h.p. 1914 Premier, 3-speed, clutch, kick, new tyres, 32 tubes, belt; ordered Overseas; £27.—Hennings, Havelock Rd., St. Yarmouth. [1073]

1913-14 Premier, 3½ h.p., sidecar, 3-speed, free engine, accessories, spare tubes, perfect order.—Maxwell, 69, Grove, Ealing. [9941]

PREMIER, 3½ h.p., late 1913, 2-speed countershaft, free engine, very powerful, coachbuilt sidecar, new August, 1917, red; £35, or separate.—23, Church Rd., Enith. [1037]

PREMIER Combination (basket), 1912, 3 speeds, clutch, pedal start, Bosch, B. and B., new cylinder, good tyres, new belt, good order; £28.—Marsh, Wiley, Glos. [X8136]

PREMIER, 1915, countershaft gears, coach sidecar, 27 gns.; 1914 Premier 3-speed combination, 39 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1142]

## Radco.

RADCO, paraffin, new tyres, belt, accessories, perfect; offers, cycle.—Bozett, Vicarage, Wellingborough [1066]

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## MOTOR CYCLES FOR SALE.

## Rex.

REX, 1914, T.T., 6-8 h.p., clutch model, handle start; 29 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1140]

## Rex-Jap.

REX-J.A.P., 1914, 6 h.p., overhead valves, sporting model, N.S.U. 2-speed gear, in good condition, lamps, and horn; £35, or nearest.—Hanby, Gas St., New town, Mount. [9973]

## Rover.

1913 3½ h.p. Rover, 3-speed, in very good condition; £28.—Missin, Cottingham, Hull. [X818]

COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [0883]

ROVER T.T., equal to new; 55 gns.; 1917 model.—Julians, 84, Broad St., Reading. 'Phone: 1024. [0929]

ROVER, 1914, 3½ h.p., T.T. Model, with Phillips pulley, very smart condition; £29/10.—Motor Exchange, Horton St., Halifax. [1004]

ROVER, 3½ h.p., late 1916, 3-speed countershaft, kick starter, head lamp, generator, rear lamp, very nice mount, perfect throughout; £55.—Meles and Meles, 156, Gt. Portland St., W.1. [1338]

ROVER, 3½ h.p., 3-speed, clutch, kick starter, mechanical horn, speedometer, T.T. handle-bars; cost nearly £85 two months ago, perfect condition; only 62 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [0930]

## Rudge.

RUDGE Multi, 1917, 3½ h.p., olive green tank, as new; 48 gns.—Below. [X818]

RUDGE Multi, 1913, combination, in very fine order, small mileage; 37 gns.—Below. [0883]

RUDGE Multi, 1914, T.T., wide tank, sporting and fast machine; 32 gns.—Below. [1004]

RUDGE Multi, 1913, overhauled and renovated, 23 gns.; Rudge, 1913, T.T., clutch, 23 gns.; Rudge 1912, 3½ h.p., 2-speed combination, 23 gns.; solo, 11 gns.; Rudge, 1912, clutch model, 17 gns.; Rudge Multi parts and valves in stock.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1131]

3½ h.p. Rudge Multi, perfect; only £25, offers.—32 Parker and Son, St. Ives, Hunts. [9931]

RUDGE Multi, 5-6 h.p., very powerful, very fine coach sidecar; £45.—Motor Exchange, Horton St., Halifax. [1004]

THE Londoun Garage, 77, Regent's Park Rd., N.W.—Rudge, 3½ h.p., T.T., 1913 (damaged, wants new front wheel, otherwise in first-class condition); 14 gns. [110]

1913 3½ h.p. Rudge Combination, N.S.U. 2-speed C.A.V. mag., B. and B., thoroughly overhauled, mileage 2,000; £20.—Clough, New Hall Hey, Rawter stall. [X816]

RUDGE Multi, 3½ h.p., 1916, tip-top condition, new Dunlop tyres and belt, engine overhauled last week Lucas lamps, Jones trip, h.b. clutch; £45, or with Canelet £17 coachbuilt sidecar, new September, unscratched, £56, bargain.—Rev. Davies, Army Chaplain Park Terrace, Sunderland. [103]

## Scott.

1914 Scott, guaranteed not done 400 miles, just new; £47.—Missin, Cottingham, Hull. [X818]

SCOTT, 3½ h.p., 2-speed, kick start, Blaks, good condition; £24.—10, West View, Hunwick, Durham. [X819]

1914 Scott, 3½ h.p. twin, 2-speed, clutch, kick start in perfect order; 32 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [113]

SCOTT, 1916 model, Lucas lamps and horn, Stewart speedometer, nearly new condition, spares, etc. £48, or nearest offer.—Dents, Stonegate, York. [102]

## Singer.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—Singer lightweight, 2½ h.p.; 14 gns. (D) [113]

SINGER, 3½ h.p., Bosch mag., good tyres, in first class running order; £25.—Pool's Garage, Bedford. [996]

## Sparkbrook.

SPARKBROOK, 1917, 2-stroke, 2-speed, barely ridden 29 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [114]

## Sun.

COLMORE Depots, Birmingham and Manchester, for delivery from stock of all models of Sun motor cycles. [0883]

1915 Sun-Villiers, unscratched, unriden for 3 months; £18/10, or offer.—69, Kingston Rd., New Malden. [1004]

## Sunbeam.

1916 3½ h.p. Sunbeam, 3-speed, lamps, horn, finish black; £68.—Below. [1004]

WE have two 8 h.p. Sunbeam combinations in stock at the present time, fully equipped and in perfect condition.—Elice and Co., 15-16, Bishopsgate, Camomile St., E.C.3. [091]

1914 Sunbeam, 3½ h.p., 3 speeds, complete with sporting sidecar; £56.—Cross, Effingham Sq., Rotherham. [X818]



## MOTOR CYCLES FOR SALE.

## Sunbeam.

1916 Model 8h.p. Sunbeam Motor Cycle, run 5,000 odd miles, perfect condition, carefully ridden solo; price £75.—D. Bolton, Froghall, North Staffs. [9988]

1916 Sunbeam, 3½h.p., semi T.T. bars, black and gold, 3-speed hand-controlled clutch, nearly new, few miles only, perfect condition, with lamps, mechanical horn.—Robinson's Garage, Green St., Cambridge. [1059]

LATE 1915 3½h.p. Sunbeam and coachbuilt sidecar, 3-speed, band clutch, all black finish, perfect condition; £70, or entertain part solo, 5h.p. Indian or Zeith, or lightweight A.J.S., Douglas, Triumph, etc.—Lieut. Moulds, 39, Greenholm Rd., Eltham. [1080]

2½h.p. and 8h.p. Sunbeams, latest 1917 models. £2 absolutely new, immediate delivery against priority permits for doctors, farmers, war and munition workers.—How and where to apply, for full particulars write, Robinson's Garage, Green St., Cambridge. [1061]

## T.D.C.

T.D.C. De Luxe, 2½h.p., 2-stroke, late 1916, little used; 17 gns.—77, Acce Lane, S.W.2. [1071]

ABSOLUTE Bargain.—2½h.p. T.D.C. De Luxe, 2-stroke, complete, late 1914; first 214 scores; must be sold instantly.—Box 1,411, c/o The Motor Cycle. [X8036]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 T.D.C., 4h.p., 3-speed, waterproof Bosch, in perfect order, 25 gns.; with coach sidecar 35 gns. (D) [1136]

## Triumph.

1913 Triumph, 3 speeds, complete with lamps; £33.—Cross, Jeweller, Rotherham. [X8140]

TRIUMPH, semi T.T., lamps set, new bars, tip-top condition; £18, or near.—P. Webster, Warwick Rd., Kenilworth. [X8174]

COUNTERSHAFT Triumph, perfect order, 69 gns.; with coach sidecar 79 gns.; complete with all accessories.—Below.

TRIUMPH, 1914, 3-speed, clutch, kick start, underslung coachbuilt sidecar, complete with lamps, horn, tools; three of the above in stock, 43, 45, and 47 gns.; 1914 Triumph, 4h.p., 3-speed, solo, 37 gns.; 1913 Triumph, 3-speed, coach sidecar, 37 gns.; 1913 Triumph, 2-speed, with sidecar, 29 gns.; 1913 T.T. Triumph, 24 gns.; 1911 standard Triumph, 17 gns.; all the above have been overhauled, and are guaranteed for three months. They are complete with head and tail lamps, horn, tools, and pump.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1134]

2½h.p. Triumph, with clutch and all accessories, in 32 good running order; what offers?—F. Rendell and Sons, Engineers, Devizes. [X8122]

TRIUMPH, T.T., unscratched, 4h.p., guaranteed equal to new, fitted with lamps, horn; a gift, £35.—Hadden, 149, St. James' St., Burnley. [1078]

TRIUMPH, 1914, 4h.p., 3-speed, clutch, new Clincher, excellent condition throughout, all accessories; £40.—Brooks, Coworth Park, Sunningdale. (D) [9949]

TRIUMPH, 1914, 2½h.p., 2-stroke, 2 speeds, condition almost as new, ridden by lady 2,000 miles only; £33.—Fisk, The Bungalow, Rushmore, Ipswich. [9948]

TRIUMPH Combination, in perfect condition in every detail; inspection by appointment, or photograph; £40.—Motorist, 20, Church St., Barrow-in-Furness. [X8066]

1913 Triumph, 3-speed, in excellent condition, and good order, with coachbuilt sidecar, with wind screen; great bargain, £43.—Harris, Jeweller, Croydon, Pem. [X8190]

1913 Triumph, Sturmev 3-speed, Canoelet sidecar, Lucas lamps, spares, all new Dunlops, excellent condition throughout; £38, or near.—S. Dixon, Grendon, Atherstone. [X8034]

TRIUMPH, 4h.p., 1914, 3-speed, been fitted with new rings and bearings, two heavy new tyres, 1in. belt, semi T.T. model, absolutely perfect; £42.—Lt. O'Hanlon, R.F.C., Dartford. [6992]

TRIUMPH, 1914 (late), 3-speed, clutch, 2 new tyres, lamps, etc., runs on neat paraffin, perfect; bargain; must sell; £35.—Ayers, Garage, Kensington Palace, W.8. 'Phone: Park 86. [9985]

TRIUMPH, late 1912, semi T.T., sound condition, fast, complete, lamps, horn, Cowey, G.A.S.P. carburettor, 100 m.p.g., tyres Palmer cord, Dunlop, nearly new; £25.—Monck, Felbridge, East Grinstead. [1015]

TRIUMPH, S.A. 3-speed, coach sidecar, P.H. lamp, horn, watch, engine had new cylinder, piston, and flywheels in 1914; good bargain, £29, or £25 solo; £3 of spares with it.—Allesley View, Allesley Old Rd., Coventry. [X8194]

## Tyler.

TYLER, 1915, 2½h.p., 2-stroke, 2-speed, splendid condition; £18.—2, Chester Rd., Seven Kings, Ilford. [9980]

THE Loudoun Garage, 77, Regent's Park Rd., N.W.—Tyler, 2½h.p., 2-speed, practically new, top hole little lightweight; 19 gns. [1106]

## Velocette.

1915 2½h.p. Velocette, 2-speed countershaft, complete, exceptional condition; £25.—Winterbottom, Jeweller, Oldham. [1053]

## NEW MACHINES ACTUALLY IN STOCK.

MATCHLESS War Mod., 8 h.p. Comb. £120 0  
MATCHLESS War Mod., lamps, horn £125 0  
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JAMES, 1918, 5-6 h.p. twin; the latest £84 0  
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Or Solo ..... £97 10  
ROVER, 1917, 3½ h.p. solo, lamps, horn £68 10  
ROVER, 1917, 3½ h.p., 3-sp. Comb., Sc. £94 4/6  
LEVIS Popular Model ..... £32 0  
CALTHORPE-J.A.P., 1917, 2½h.p., 2-sp. £39 16  
ALLDAYS ALLON, from ..... £37 10  
ROYAL RUBY, all models from ..... £32 10

## SECOND-HAND MACHINES.

ENFIELD (2) 1916 6 h.p. Comb. £110 & £105 0  
ENFIELD, 1916-7, 6 h.p., hood, lamps £115 0  
ENFIELD, 1916, 6 h.p. Comb., access. £78 10  
H-DAVIDSON (2), 1915, Sc. £72/10 & £68 10  
HARLEY-DAVIDSON, 1915, elec., Sc. £75 0  
HARLEY-DAVIDSON, 1915, Sc., screen £22 10  
SINGER, 1913, 4½ h.p., 2-sp., c/st., solo £29 10  
ARIEL, 1915-16, 3½ h.p., c/st. Comb. £72 10  
TORPEDO-PRECISION, 2½ h.p., clutch £12 10  
JAMES, 1916, No. 6 Comb., lamps, horn £73 0  
JAMES, 1913, 4½ h.p. solo, with access. £22 10  
INDIAN, 7-9 h.p., 1915 cl. mod., lamps £55 0  
LEVIS Popular, 1916, sound, with acc. £76 10  
NEW HUDSON Comb., 3½ h.p., 3-speed £35 0  
CONNAUGHT, 1916, 2½ h.p., S-I.T. bars £22 10  
ALLDAYS ALLON, 1915-16, s-p., accs. £25 0  
O.K.-JUNIOR, 1914 late, 2-sp., cl., k-s. £43 10  
LUGTON, 1913-14, 4 h.p., 2-sp. B.S.A. £29 10  
B.S.A. Auto-Whizz, 4 h.p., 2-sp. B.S.A. £7 10  
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## MOTOR CYCLES FOR SALE.

## Victoria.

VICTORIA-PRECISION, 1914 T.T., 4h.p., waterproof Bosch, fast machine; 19 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1161]

## Williamson.

WILLIAMSON 8h.p. w.c. 1914 Combination, hood, wind screen, extra detachable box body; £65.—69, Park Hill, Clapham, S.W. [9969]

## Wolfe.

WOLF Motor Cycle, 2-stroke, 1915; quick sale £15.—Apply, A.M.E. Co., 1, Eltham Rd., Lee Green [9974]

## Zenith

1917 Zenith-Gradia, 8h.p., barely soiled, 72 gns.; also 1913 Zenith-Gradia, 4h.p., 25 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1135]

1917 Zenith, 4-5h.p., clutch and kick start, only ridden a few miles, and as new; £75.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [10481]

## Ladies' Motor Cycles.

LADY'S Douglas, 2½h.p., 2 speeds, fine gear, good tyres; sacrifice £25.—Farrar's Motorcycles, Hopwood Lane, Halifax. [1112]

1917 New Imperial-Jap, 2½h.p., 2-speed, clutch, kick start, soiled only; 37 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1133]

## Miscellaneous.

BOOTH'S Motorcycles, Portland Place, Halifax.—Detailed list of motor cycle bargains free.

HARLEY-DAVIDSON, 7-9h.p., fitted with grey coachbuilt sidecar; £69/10.—Booths Motorcycles.

TRIUMPH, 1910, free engine, T.T. bars, good tyres; £18/10.—Booths Motorcycles, Halifax.

BRADBURY, 4h.p., 1911, Grade gear, coach sidecar, with screen; £25/15.—Booths Motorcycles.

TRIUMPH, 1911, free engine model, in nice condition; £21/15.—Booths Motorcycles, Halifax.

REX, 6h.p., 1909, mag., spring forks, good tyres; £15/15.—Booths Motorcycles, Halifax.

REX, 6h.p., 1911, m.o.v., N.S.U. 2-speed; £18/15.—Booths Motorcycles, Halifax.

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2½h.p. 1914 T.D.C., £14/15; 1916 T.D.C., £17/10; 2½h.p. 1914 Sun-Villiers, £16/15.—Booths Motorcycles.

B.S.A., 4½h.p., 1914, with sidecar, £45/5; Scott, 1912, and sidecar, £29/15; Rudge, 912, Grade gear, £19/15; Rudge, 1913, Multi gear, £25/15; 3½h.p. Excelsior, £4/19.—Booths Motorcycles, Halifax.

3½h.p. Combination, 2-speed countershaft, free engine, £2 kick start, B. and B. carburettor, Bosch mag., coachbuilt sidecar, good order; £22; new set lamps.—50, Caroline St., Dudley, Worcs. [X8135]

MESSRS. RIDER TROWARD and Co. have in stock for immediate delivery over 100 second-hand machines, including every known model. Lists free. Exchanges undertaken.—31 and 78, High St., Hampstead. (D) [1132]

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BARGAINS.—1915 Wolf 2-stroke, single-speed, £16/10; 1915-14 3-speed 4h.p. Triumph, £36; 1914 7-9h.p. Indian combination, 2-speed, kick-starter, £38; 1913 Scott combination, ditto, £40; cash bargains, no exchanges.—Please call, Douglas S. Cox, The A.S.M.M., 6c, Lansdowne Hill, West Norwood. [9933]

## BODIES.

FARLOW Coachbuilt Bodies. We can deliver from stock.—Farrar's Motorcycles, Halifax. [1482]



## BODIES.

**CLEARANCE Lines.**—Large stock cane sidecar bodies offered, stock soiled only; low prices.—Willowbrook Co., Leicester. [0901]

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## SIDECAR ATTACHMENTS.

**UNDERSLUNG Cane Sidecar; £23/10.**—69, Kingston Rd., New Malden. [1065]

**CORONET Sidecars.**—Illustrated catalogue free upon request.—Booths Motories, Portland Place, Halifax. [9845]

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**CORONET Sidecars from £9/15;** special model for Indians, enamelled red, 28in. tyre. [9847]

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**CORONET Sidecars are made to suit any machine,** and delivered from stock. [9849]

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**SIDECARS, touring, sporting, lightweights, fit all makes of motor cycles;** hoods, screens, and chassis supplied; few shop-soiled models in stock, bargains; export a speciality.—Barbury Sidecar Works, 389-397 Farm St., Birmingham [7554]

**SIDECARS, touring, sporting, and lightweights, fit all makes of motor cycles;** hoods, screens, and chassis supplied; few shop-soiled models in stock, bargains; export a speciality.—Barbury Sidecar Works, 389-397 Farm St., Birmingham. [8082]

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**RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1913 G.N. cycle car, 8-10h.p., 55 gns.; 1915 Carden Monocar de Luxe, 2-speed, special model, 49 gns.—(D) [1125]**

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**52 Cars Actually in stock; selection only given; full list on application: all kinds, including 10h.p. Napier chassis, £25; Argyl, 3-seater, £35; sporting 2-seater, £45; 1-ton van, £50; several chassis, £50; Flanders, £65; 12h.p. 4-cyl. Sizaire-Naudin, sporting 2-seater, £75; 1914 Buckingham cycle car, £85; Maxwell, £100; Belsize, £125; Racer, £125; Adamson, £135; Paige, £135; English Ford, £135; Le Gu, £145; Turner, £165; 2-ton Bedford, £165; Loco, £165; 11.9 h.p. Belsize, dynamo, £185; Crossley, £200; Siddley, Densar, £235; 1916 Knight-Russell chassis, £350; Kiaz, £365; Napier, interior drive saloon, enclosed valves, £450.—Below.**

**DOUGLAS S. COX, the absolutely straight motor man, 6c, Londowine Hill, West Norwood, S.E.27.**—50 cars always on view. Please call. Exchanges or offers invited. Out for business. Established 1902. [1088]

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**EXTENDED Payments.**—All makes supplied; lowest terms.—Service Co., 292, High Holborn, London. [0618]

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**COX'S Gas Trailers (Provisional Patent 11,961-17).**—From all garages, or Douglas S. Cox, 6c, Lansdowne Hill, West Norwood. [1084]





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**Coal Gas.**

**O**WING to the recent Motor Spirit Restriction Order the only fuel available for motor cycles used for private purposes is coal gas. The difficulty of storing the gas, great enough in the case of cars, is even greater in the case of motor cycles. A gasbag carried on or in the place of the sidecar body contains only sufficient gas for a very few miles, while the wind resistance offered by the bulk of the container is an important item.

The trailer is a slight improvement so far as capacity is concerned, but it can hardly be considered an ideal solution of the problem. Then there is the question of pressure storage, which at present constitutes a still greater difficulty, as this system is not by any means looked upon with favour by the authorities. Finally, there is the question of the best means of introducing the gas into the cylinders, the question of gas carburetters, and of control.

The whole matter of the use of coal gas as applied to self-propelled internal combustion-engined vehicles is in its infancy, but if it be studied carefully now, and the Government does not want to hinder development merely for the sake of stopping private motoring, coal gas as a fuel may continue after the war to the great advantage of the nation, as it will be a home-produced fuel, and, as such, deserves all the encouragement that can be afforded to it.

The governing body of the gas industry, which assumes practically the same functions in the gas world as the Auto Cycle Union does in the motor cycle world, is the British Commercial Gas Association, and it is ready and anxious to do all it can to promote the use of coal gas on motor vehicles. It has appointed a special committee to investigate the subject in the most thorough manner possible, both from the technical and commercial points of view, but we doubt if the question of motor cycles has yet come under its notice. We venture to suggest that it would be an excellent

plan to approach this body with the idea of getting motorists represented on this committee. Why should not the R.A.C. and A.C.U. both communicate with the British Commercial Gas Association, so that technical members of these two bodies may represent their respective institutions on this committee? The idea, if carried out, would be of considerable advantage to all parties concerned, we feel sure, and would be of great benefit to the motoring community as a whole.

**The Trend of Design.**

**A**WRITER in this issue deals with the trend of British design as it appears to one more or less intimately in touch with trade affairs; but naturally much bearing upon this subject has been left untouched. Few post-war models have been materialised, far less subjected to such searching tests as must inevitably take place ere any radical changes can be accepted as permanent, and for this reason it appears to us an open question whether any startling developments will immediately follow the return of peace. There is no doubt that an immense boom in the motor cycle trade will quickly succeed the disbanding of our armies, but how many manufacturers will be prepared for it—far less prepared to launch new departures on to the market in the shape of spring frame and four-cylinder models? It is quite conceivable that the first rush will be met by a supply of machines conforming more or less to pre-war ideas, and that the change will come slowly but surely after competitions are resumed and the new designs, etc., have been thoroughly tried.

Steel cylinders and aluminium pistons, spring-frame flat twin and four-cylinder sidecar mounts will not coincide with the first competition held, for though manufacturers may now have the knowledge which renders these changes possible time will be required for the development and materialisation of their schemes.



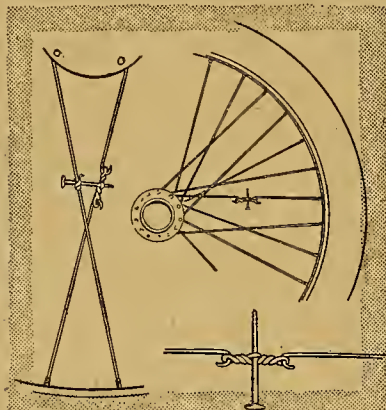
# IDEAS: Useful and Ingenious.

Gray R. Jones



## A USEFUL REPAIR.

THE following wrinkle, taken from our contemporary *L'Automobile aux Armées*, shows a simple method of mending a broken spoke with the aid of a piece of wire and a French nail. The sketch shows the method of repair so clearly that it is hardly necessary to explain it. The two ends of the broken spoke are bent backwards, the piece of

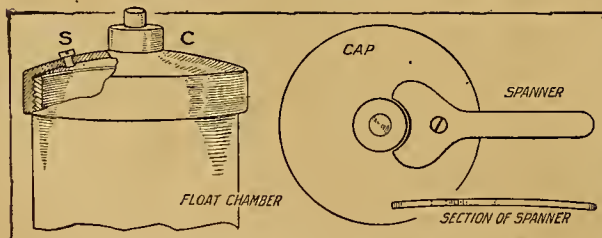


An easy method of repairing a broken spoke.

wire being wrapped round the two hooks formed, and tightened by means of a French nail. When sufficient tension has been exerted, the head portion of the nail is wired to the next available spoke, and by this means a satisfactory temporary repair effected.

## SPANNER FOR A FLOAT CHAMBER CAP.

I FOUND the cap of the float chamber of my Amac prone to work loose on its threads, and, if tightened up with the fingers, it was almost impossible to loosen it again without recourse to tools. It was no use gripping it by means of gas pliers, as this part is merely riveted on the underside of cap and turns without the cap as a whole, and it is difficult to get a tool to open wide enough to grip the outside milled ring. I made a little spanner out of  $\frac{1}{8}$  in. mild steel, which



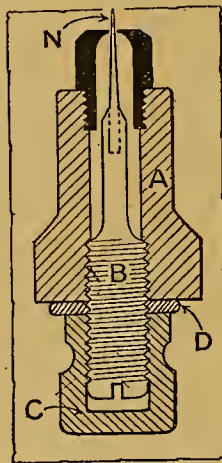
Making a spanner for a float chamber cap.

works very well. At S I drilled and tapped cover to take a small cheese-head screw, burring the thread over on the other side. The spanner has a hole which fits over this screw, and the splayed end takes a purchase against the central milled cup for either tightening or loosening. The spanner is slightly bent to conform to the contour of the cup.—F. C. RENYARD.

## ADJUSTABLE JET FOR CARBURETTER.

IN the issue of *The Motor Cycle* for October 18th there is a design for an adjustable jet fitted to a B. and B. carburettor. This contains a gland and

stuffing box to allow for screw adjustment, and it is very doubtful whether such a gland would not leak during the whole of the running period, bearing in mind the active permeating properties of petrol. The present design, fitted to an Amac, obviates the use of a gland. A is the jet holder of the carburettor, which is drilled and tapped (to BA) at the base. B is the needle holder of the brass, screwed to BA, and fitted at its upper end with the tapered needle (also of brass) soldered into it. C is a cap screwed internally to BA and milled on its outside edge. B is made a tight fit in its threaded hole, while C screws on somewhat loosely.

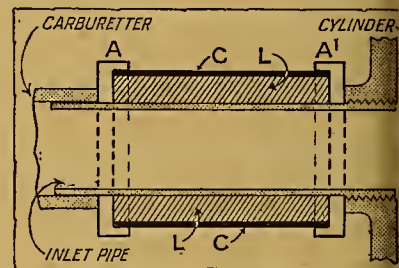


An adjustable jet which obviates the use of a gland.

By means of a screw-driver slot, after C has been removed, the needle can be adjusted by rotating B. Cap C is then screwed up hard on to the leather washer D, thus locking B in position and sealing the whole against any fuel leakage. A disadvantage is that a dismount has to be made to adjust the needle.—F. C. RENYARD.

## NEAT LAGGING FOR STU INLET PIPES.

THIS method can be applied where the inlet pipe consists of a straight tube connecting the carburettor to the cylinder. The pieces AA' are brass turned to slide easily on the pipe, and flanged to a depth of about  $\frac{1}{4}$  in. LL is lagging, consisting of asbestos string wound tightly and ever over the inlet pipe to the thickness of about  $\frac{1}{4}$  in., the brass piece A' having

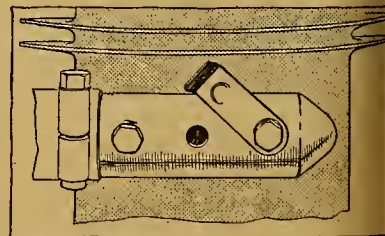


A tip for the fastidious owner.

first been placed in position. CC is sheath of thin copper cut and bent as just to close round the lagging and fit under the flanges of the end cap. Piece A is now placed in position, at the carburettor union, on tightening it will hold all secure. The particular merit claimed for this method of fixing is its neatness.—F. C. RENYARD.

## A FOUR-STROKING CURE

I RIDE a 2 $\frac{1}{4}$  h.p. Popular Levis, and have tried everything I can think of to stop it from four-stroking, and only succeeded when I adopted the very simple idea of taking off the inlet pipe which unscrews with two screws. Between these I have drilled a  $\frac{1}{8}$  in. hole and fastened there a piece of sheet iron. This I bent at one end, thus enabling it to close and open it easily. I find it travel at nearly a walking pace without four-stroking, besides getting better mileage to the gallon and keeping the engine cooler.—H. I. NORTHAM.



An idea easily adopted for preventing four-stroking of two-stroke engine





### Promising?

WHAT do you say about a piston which permits you to slosh just as much oil into the crank case for splash purposes as you like, but does not permit a drop to enter the combustion chamber, and carbonise things up for you? It is one of those tail war inventions which ought to alleviate the motor cyclist's lot in years to come. I believe the Germans know all about it, and should love to draw for you; but the fist of Dora is heavy, and her brain not always as discriminating as one could wish, so refrain for the present.

### Cheaper Motor Cycles?

ENGLISH makers have usually admitted that we should never see really cheap motor cycles until we got enormous factories supplying an enormous market. In America we see both, and, as consequence, you can buy (or, I should say, could in pre-war days) a first-class machine at a price which would be sensational in this country. Freight, insurances, and concessionaires' profits have always added us to the real price conditions of the American motor market. Thus, in 1914, a Ford four-cylinder cost no more than £77 at Detroit, and 7 h.p. *Glens de luxe* were retailed in the States at about £55, if I am not mistaken—a price which compared very favourably with the prices of most Coventry 2 h.p. machines without full road equipment. Moreover, viewed in relation to wages, these prices were much lower than they looked. A £60 British 2 h.p. represented from twenty to thirty weeks' wages for a British working man. A £55 Indian might not represent more than eight or nine weeks' wages to some American mechanics, and from this standpoint its selling price was actually the equivalent of what £18 to £25 would mean to a Coventry mechanic.

### After the War?

NOW it is just possible after the war that some of the essential features of the American industry will be reproduced over here. During the war many British working men have earned weekly sums nominally equal to those of their American *confrères* though the purchasing power may not have been the same. It is generally believed that wages in this country will never sink to their old level. I dare not intimate that the purchasing power of a sovereign will ever again be what it was in 1914, but it is on the cards that the British working man will be able to buy a motor cycle. If so, we shall get one of the essentials of a cheap motor cycle, viz., a huge home market. The second essential—huge outputs—is also within our grasp. We have a great number of colossal modern factories, now busied with munition work, but capable of being converted to other purposes, many of them designed and built with at least half an eye to subsequent employment in the quantity production

of cars and cycles by the thousand. On the whole, therefore, we may live to see the cost of a motor cycle vastly reduced in the sense that it will not take so many days' or weeks' wages to buy one. Years ago the Rex Co. made a brief experiment in selling motor bicycles of 3½ h.p. at twenty-five guineas apiece. It failed because the market was too small and the production was on too small a scale. We may live to see giant production for a giant market. But what will our roads be like at week-ends?

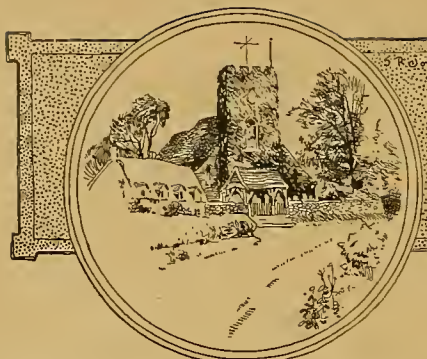
### The Benches and Trenches.

A WEEK or two ago, being very profoundly touched by some sneers aimed at munition workers in my presence, when I was fresh from learning some tragic facts about certain munition hands who were worked to death in 1914-15, I penned some rather violent and exaggerated words comparing the benches with the trenches. I quite expected to be adequately "ticked off" from the trenches for this offence: for in cold blood I fully realise that no such comparison is fair, and that no munitioneer has ever suffered, or could ever suffer, what the infantry in Flanders have borne during the last month, for example. But the soldiers let me down very lightly, realising perhaps that many munition workers, and notably some of those who are physically unfit for soldiering, have played the hero in this war, and are now paying for their self-sacrifice. The only criticism addressed to me personally was a quiet request that I should read, mark, learn, and inwardly digest "Under Fire," which I have done. I think it was high time somebody spoke up for the munitioners, and I am glad I did it; but I do not seriously wish to pretend that the average munitioneer's part in this war compares with the average fighting man's.

### Two Examples.

WE all know there are munitioners who have earned colossal wages ever since 1914 without any detriment to their health, who have spent their royal earnings in orgies of self-indulgence, and have hampered output callously. It is this small percentage of black sheep who have inspired sneers which are a gross insult to most of those who work at the benches. My words were provoked by two death beds—one of a girl, who had worked till she dropped, without complaining, and who died at the end as quietly and simply as a good soldier dies; the other of an elderly man, who, after giving his only son, laboured at the factory for excessive hours until he could work no longer, and passed to his rest in sublime unconsciousness of the fact that his death compares in self-sacrifice and gallantry with a soldier's death. We keep a more wary eye on the benches nowadays—such things are probably impossible in 1917. But in 1914 they were possible, and they occurred. When we think of the fallen we must remember such stay-at-homes as these.





## THE TREND OF BRITISH DESIGN.

### SOME NOTES ON THE PROBABLE TENDENCY OF POST-WAR DEVELOPMENT.

EVERY British manufacturer is to-day considering his after-the-war programme, and it is certain that, when conditions permit the ordinary course of manufacture to be resumed, we shall see many drastic alterations and revisions in British motor cycle design. Not only does this apply to engine design, but similarly to frame design, for in this direction we have a unanimity of opinion as regards the desirability of straight tube triangulated structures. Frame design in the past has not been remarkable for the science brought to bear upon it, and herewith is given a common error that has existed hitherto. In order to obtain a desirable length of steering head, the design shown in fig. 1 has been adopted by many factories. Its imperfection is



Fig. 1.—An undesirable method of obtaining a good length of steering head.

obvious, for frames of this design commonly break at the point A.

That a good length of steering head is in every way desirable is admitted, of course, but this feature should be attained in some other way.

Before dismissing this point, there is one other common and undesirable feature to be discussed, *i.e.*, the curved top tube shown in fig. 2. Obviously, no curved tube is so well able to resist tension and compression stresses as a straight tube, and the only grounds for employing such a design are those of elegance and convenience. As an engineering proposition, it is intolerable, and therefore doomed to become as extinct as the proverbial dodo.

Fig. 3 shows how one leading British firm, Messrs. A. J. Stevens and Co., Ltd., of Wolverhampton, have overcome the two weaknesses referred to, and without robbing the machine of a low saddle position and low centre of gravity. It will be seen that the latest A.J.S. design permits a steering head of abnormal length, while retaining its

low frame structure throughout. The large capacity tank, by the way, straddles the top tube, as shown in the drawing, and thus the curved tank, which is admittedly graceful, is retained.

#### Some Examples of Correct Design.

Such common errors as these two will not exist in post-war design. It is admitted by every British manufacturer that convention must go by the board in favour of the adoption of straight tube triangular structures. The idea of adopting such principles is not merely to obtain increased strength, but equally to reduce weight. If a correct design is adopted, a much lighter frame can be used, and will be equal, or superior, in strength to an incorrect design which holds together simply by the strength of huge masses of metal. We are none of us unfamiliar with the stamp of designer who, in finding that his top tubes break, attempts to overcome the weakness by using reinforced tubing or tubing of much heavier gauge, but such principles cannot hope to survive the test of time. Let us have reinforced tubing by all means, but let us not use it to overcome weaknesses arising from bad design.

In dealing with this subject, I cannot do better than refer to a British engineer whom I regard as a past-master in frame design — Mr. Alfred Scott. Following upon the Scott Sociable, which is a really fine example of straight tube design, we have the detachable and interchangeable tube motor cycle.

One attractive feature of Mr. Scott's work is his absolute disregard for the conventional order of things, and, just as years ago the Scott motor cycle was greeted with a wave of amusement, not to say derision, so the lopsided unconventional Scott Sociable is a target for the innuendoes of those who dislike the unusual. Yet unquestionably this machine stands high as an engineering proposition, and its effect upon the general trend of design will probably be far-reaching.

The construction of the Scott Sociable is such that all main stresses fall at the apices of the triangular structures, and as will be seen by reference to the drawings overleaf, the same principle employed in the new Scott frame is illustrated.

#### Where Weakness Exists.

The foregoing, then, may suffice to indicate the general trend of British feeling as regards frame design. The war has taught us that our frames to-day, though they survived previous competitions fairly satisfactorily, far from being so good as they might be. Lack of scientific design has been illustrated at every corner. Frame breakage, indeed, has been the curse of military motor cycle. Machines of great strength and well-proven reliability were chosen, but the abominable road surface of the fighting fronts soon caused fatigue to the frame members, and usually it was the most unexpected member that succumbed to the strain. It has been realised, then, that frame breakage can only be eliminated by the employment of correct designs, and that in this direct weight can be considerably reduced. Better springing and vibrationless engine will, in conjunction, make the ideal motor cycle possible.

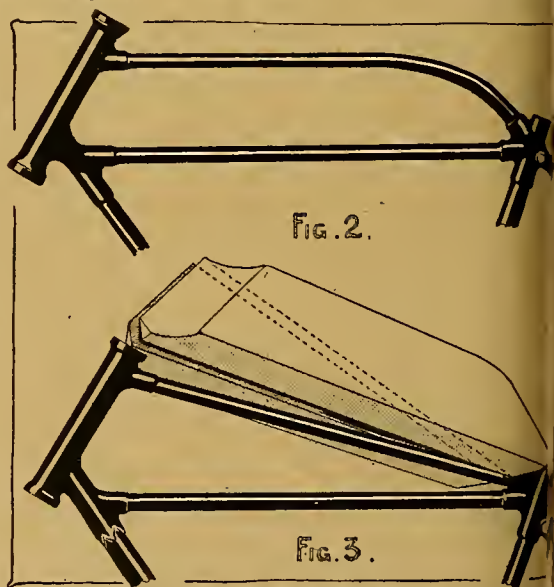


Fig. 2.—The curved top tube of weak structural design.  
Fig. 3.—The A.J.S., an excellent design, permitting a good length of steering head and a truly triangulated frame.



### The Trend of British Design.—

It may be thought by many that during these troublous times, when every British manufacturer is tied down to the production of more or less stereotype materials, and while the few factories chosen to supply motor cycles to the War Office are compelled to stick to one pattern, which may be their 1914 model unaltered, British motor cycle design is practically at a standstill. This is by no means so. Almost every motor cycle factory in the British Isles has far-reaching alterations in view. Many systems of rear springing are, of course, under consideration, and many promising designs are on the drawing boards—some, indeed, are on the road. But it is in engine design that we shall find new departures most general.

This, however, is not the result of weakness that the war has proved to exist. On the contrary, the engines have stood up to the gruelling wonderfully well, but the motor cycling public have at last awakened to the fact that the silent, vibrationless, engine is not only within the range of possibility, but can be had for the asking. Why, then, put up with noisy, unbalanced, engines, which not only detract from the pleasure of riding, but which cause undue strains on every portion of the machine, and cause the shedding of nuts and small fittings?

### Engine-Power Weight Ratio.

In the interim enormous strides have been made in air-cooled petrol engines. The aeroplane has taught the Britisher a good deal since 1914 as regards the possibility of reducing the weight-power ratio of petrol engines. Thousands of motor cyclists are now intimately associated with these marvellous air-cooled engines, and naturally these men will demand something more in keeping with the times than the hitherto heavy cast iron air-cooled cylinder.

In all probability they will not have to wait twice. Many of the firms now making aero engines will apply their knowledge to the manufacture of motor cycle engines after the war. Aero engine principles are stamped indelibly upon the minds of engine designers, and consequently cannot help but reflect very considerably on the post-war air-cooled motor cycle engine. Lightness and reliability are the two chief points of the aero engine, though it may be added that aero engine designers have much for which to thank the motor cyclist. Steel cylinders and aluminium alloy pistons will tend in the direction of high horsepower and cool running of engines of great weight.

### Most Popular Types.

Two types of engines appear to be absorbing the attention of the trade, and promise to become popular types in the future, viz., the horizontally-opposed twin and the four-cylinder; the former for light solo work, and the latter mainly for passenger work.

Naturally, the plea for vibrationless engines delivering an even torque has attracted interest to these two, and most leading manufacturers are experimenting with flat twin or four-cylinder designs in their post-war catalogue. Thus it is unreasonable to suppose that the

single-cylinder and the V twin, which have enjoyed long prosperity and success, will slowly, but surely, be superseded by these engines of superior balance and torque.

The idea has long prevailed that multi-cylinder engines are taboo for motor cycles on account of their multiplicity of parts. "Four plungers are more likely to give trouble than one; eight valves less reliable than two," has been the general statement, but aero engine practice has proved this to be a fallacy. The eighteen-cylinder overhead valve has shown itself one of the most reliable designs adopted by the War Office, and has served to illustrate the fact that a number of light parts working at light load are less likely to give trouble than a few heavy parts doing heavy work. The success, moreover, of such machines as the Henderson and the F.N. has done much to stimulate interest in the four-cylinder mount.

### The Question of Transmission.

In combination with such a unit the enclosed shaft drive is undoubtedly "the

field, which will still further have the effect of softening the drive.

It is distinctly refreshing to note that another change which bids fair to materialise is in the layout of machines primarily designed for sidecar use. Hitherto, for some unaccountable reason, practically all the adjustable parts are on the sidecar side, so that the rider is compelled to hang head downwards between the machine and the sidecar in order to make the most trivial adjustment.

It is next door to impossible to make an accurate adjustment under such conditions, and I learn that several of our leading designers intend to have all adjustments on the right-hand side of the machine in their post-war models.

### Detail Refinements.

Doubtless the single and the V twin will live, but both will be seriously rivalled by engines of superior balance and torque. The light high-speed flat twin will unquestionably enjoy wide popularity, particularly among the class of rider at present serving as a D.R.,

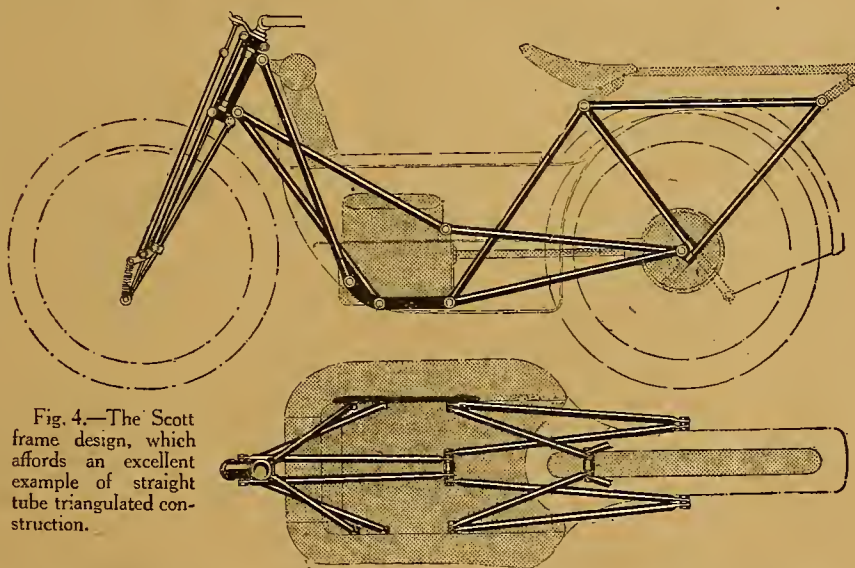


Fig. 4.—The Scott frame design, which affords an excellent example of straight tube triangulated construction.

goods," and the difficulties in the way of its development are not so great as generally supposed. The argument that a solid drive is permissible with an engine of even torque will not hold water, for there are times when the best of engines will not pull smoothly—when starting up from cold on a frosty morning, for instance. Therefore a solid drive cannot be excused on the grounds that nothing better is necessary, and the shaft drive of the future must be sufficiently yielding to transmit a reasonably even torque to the rear wheel even if used in conjunction with a single-cylinder engine.

### A Sidecar Improvement.

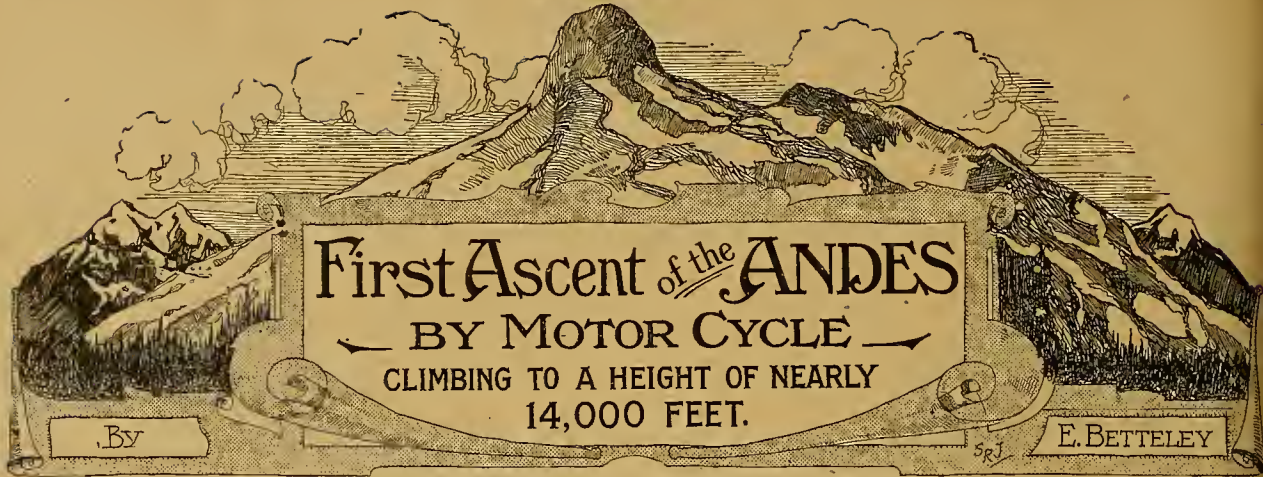
To attain this, the clutch design can be such that it acts automatically as a friction shock absorber, the drive passing through the clutch spring, which functions further as a spring drive, while the low-speed bevel or worm on the back wheel may contain a large rubber block shock absorber on the lines of the En-

and it is safe to speculate that four-speed gears will become the common order.

So much, then, by way of a rough outline of the general trend of British design, as intimated by the atmosphere that prevails in engineering circles. Simplification of control may lead to the employment of one twist grip regulating the magneto timing and the exhaust valve lifter. Wide mudguards with ample wheel clearance are becoming general; so also are larger tool cases and more efficient clutches. It can be taken, therefore, that interesting times are ahead of us, and that every sporting rider can look forward to possessing a really "hot stuff" mount in whatever class he favours when normal conditions return, and "hot stuff" be it noted, that will essentially differ from pre-war "hot stuff" in that it will not be acquired at the expense of reliability, handiness, smoothness of running, and all the other incidentals that go to make the ideal motor cycle and the happy motor cyclist.

CHINOOK.





(Concluded from page 444.)

After a short respite on the plain we start up a good 15% grade which leads to Portillo. It was on this stretch that the spades carried by the motor cars had to be used for the first time to clear the road of the *débris* which blocked it for a distance of fifty feet—the effect of a storm of the previous week. It was fatiguing work, as the height was now great and the rarefied air tired us greatly, but at last the motor cycles and cars could go through, and we were under the Trasandine railway bridge of Portillo at 10.30 a.m.

Still another rest, and we were once more ascending by a zigzag road of loose stones and terrific gradient; the driving wheels of the cars refused to grip, and the cars had to be pushed up the steepest portions. From this part of the road we caught a glimpse of the beautiful Inca lake, situated amidst the mountains at a height of nearly 10,000 feet, with its waters of a fine deep blue. More climbing and then the way was easier, and at last we were able to let the engines pull on high gear for a short distance and reached Caracoles station (kilometre 66) at the entrance of the big international tunnel which ends in Argentine territory.

At twelve o'clock we had replenished the tanks with the petrol sent up days previously by rail, and consumed the eatables which were to supply us with the much needed energy for the final effort.

At one o'clock Macchiavello once more started ahead and began to climb the interminable zigzags which ascend from a height of 9,800 feet (Caracoles) to the Cumbre, 13,905 feet, in a distance of nine kilometres. Cars and motor cycles were all working well; Droste's Motosacoche was now partially cured of its carburettor ailment.

#### Narrow Roads and Hairpin Bends.

Four kilometres after leaving Caracoles, the road—which runs on a mountain side down which tumble the avalanches in winter, leaving scarcely a trace of the path—was obstructed by a big landslide, through which a way had to be cleared. The constant use of low gear made the water in the radiators of the cars evaporate quickly, and the motorists had to resort to snow. Another alarming difficulty which arose was the narrowness of the road; in few places was it more than twelve feet wide. In most of the hairpins we had to dismount and run alongside our machines, and the

cars had to reverse three or four times on each bend—an operation not free from great danger, as there is nothing to prevent the vehicles from leaving the path (it could not now be called a road) and falling hundreds of feet in the case of a wrong manœuvre. It is as well for me to mention here that this international road has not been used since the Transandine line was opened to traffic; the coaches which ran from Caracoles to Las Cuevas (Argentina) were doomed once the tunnel was finished, and the road is only kept in good order [!—ED.] for strategical purposes. . .

The end of our climb was getting nearer and nearer, but those last few kilometres seemed to lengthen immeasurably; with what pleasure did we not pass those last indicating kilometre posts: 71, 72, 73, 74. . .

#### The Last Lap.

We were now but 1,000 metres from the Cumbre; our triumph was at hand. We were to be the first motor cyclists to climb the Andes. But those silent mountains had in store for us a final barrier to stop the progress of the motor cycles that for the first time tried to scale their heights: we saw with dismay that the last stretch of road was thickly covered with snow. Were we to be beaten within sight of our goal? No, come what may we would push on with our bicycles. The cars plunged through the snow, and we motor cyclists followed, sometimes on their tracks, a second afterwards dismounting and pushing; now we could see the big statue of Christ, and its sight gave us renewed energies. Wheels revved in the snow and mud, and we sustained falls again and again, but the machines were lifted without stopping their engines, and the riders jumped on to them once more, only to fall a little further ahead. It was now a case of everyone for himself; we did not offer assistance, and nobody asked for any, as he was sure of not getting it in that struggle to reach the finish. A last effort, and one by one the motor cyclists dropped exhausted by the side of their machines beneath the big statue. My watch pointed to 4.15. A moment afterwards the icy wind blowing from Chile carried into Argentina the cheers of all the party; we had succeeded in our attempt, and had reached 13,905 feet above sea level.

Cameras were produced and snapshots of the party taken at the base of the statue, and we then spread



**First Ascent of the Andes by Motor Cycle.—**

over the small plain, and not a few were in Argentine territory for the first time. We were soon compelled to take refuge from the cold wind, which cut like a thousand knives right into our very bones, in one of the concrete buildings which have been erected in those heights as in the Alps; the inner walls were inscribed with the names of those who had reached the Cumbre, and amongst them was that of Mr. Johnson, who was the first motorist to reach the Cumbre early in 1914, when he crossed the South American continent from Buenos Ayres to Valparaiso with a Buick.

We would have liked to remain a long while on that small plain admiring the fine view: a sea of snow-covered peaks in every direction, and, crowning all, the great Aconcagua, towering to a height of 22,424 feet—the highest mountain of America; but the cold was intense, and we were soon wending our way down to Caracoles.

**The Descent in the Dark.**

Had we followed our itinerary we should have stayed the night in Juncal, but we decided to go back to Los Andes that same night if possible, so as to be able to return to Valparaiso next day. Progress was slow at first on account of the quickly fading twilight, and as the moon did not rise sufficiently till late the cars had to go behind us, illuminating our road with their lamps. The innumerable bends made this difficult, as the road was lighted for brief seconds, and then complete darkness when the light left us.

After passing Juncal, moonlight made matters easier, but even then one had to drive carefully. Droste tried to go ahead and paid the penalty, as he

finished in a hole with the frame of his Motosacoche cracked under the tank. We had to wait for the motor cars and tie the bicycle to one of the Fords, perched on which it completed its journey; it was the only accident worth mentioning that happened during our trip.

**The Return and a Review.**

At one o'clock in the morning of the 18th (Sunday) we reached Los Andes, and next day Blot and I covered the distance to Valparaiso with the cars, the rest journeying by train.

As a whole the motor cycles performed very well; Indians, Excelsior, and Henderson rivalled in climbing. The Motosacoche has a splendid motor, which can stand very hard work without overheating, but the carburetter spoilt the joy of riding an excellent bicycle. As to the tiny Humber, its little engine worked wonders during the ascent, although it overheated too quickly on account of the very low gear; decidedly  $3\frac{1}{2}$  h.p. is the smallest engine one should think of using for a tremendous climb like that of the Andes.

I cannot end this account of our successful climb without a word of special praise for my Henderson. It has a motor that pulls without any fuss whatever; its acceleration power is terrific, and in all respects but one is ideal for a country like ours. The one point which I find lacking is the absence of a few leaf springs, like those fitted to its brother from Springfield, between the rider and the back wheel. Let us hope that the day is near when we shall ride a Henderson fitted with leaf springing front and rear.



At an altitude of 13,905 feet above sea level. The party at the foot of the statue, the highest point reached by the international highway between Chile and Argentine. Although the road was covered with snow part of the way up to the summit, none was to be seen on the summit itself on account of the strong west wind which blows continually.

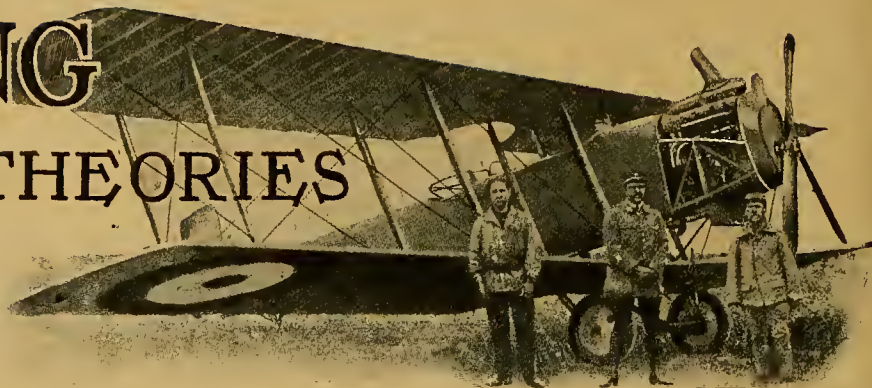


# FLYING

## FACTS AND THEORIES

### RELATIVE MOTION AND MOMENTUM.

By W. G. ASTON, A.M.I.A.E.



THIS series of articles was begun with the definite objects firstly of imparting information, and secondly of correcting existing fallacies, in connection with aeronautics generally. That there is probably a scope for the former, and most certainly a scope for the latter, is proved by the letter which appeared in the correspondence columns of *The Motor Cycle* last week over the initials "O.J.F.S., Lt. R.F.C." As I propose to answer this letter at some length, and as the matter is one of considerable importance, I reproduce his letter below, merely observing, in passing, that I am rather disappointed to find that he alone, out of the many thousands who hug this particular fallacy, has come into print to take up the cudgels on its behalf.

Sir,—I have just read in your issue of October 11th an unsigned article on the theory of flight. I do not know if the author is a pilot, but I venture to doubt it, and also to question his assertion that "turning an aeroplane 'up wind' and 'down wind'" are not different operations. Every embryo pilot is impressed by his instructors with the danger of turning *down* wind close to the ground. Why? Because a machine stalls far more easily if turned down than up wind, and for this reason: Suppose the speed necessary to keep the machine in the air to be 50 m.p.h. and the speed of the wind to be 30 m.p.h., an aeroplane travelling up wind has a speed relative to the ground of 20 m.p.h., and in order to support itself whilst travelling in the opposite direction it must have a ground speed of 80 m.p.h. It is scarcely prudent to ignore the earth in this matter, as this is where momentum, apparently forgotten by your contributor, plays an important part, it being obviously a slower business to lose a velocity of 20 m.p.h. in one direction and gain one of 80 m.p.h. in the opposite direction, than to lose one of 80 m.p.h. and gain 20 m.p.h. Similarly, a machine turning down wind needs less bank than one turning up wind, as, having less ground speed, it has less momentum to lose, and the centrifugal force is nothing like so great.

I have not yet seen your issue of October 18th, so do not know if any other criticisms of this article have reached you, but it appears to me that such an article might possibly be extremely dangerous by giving some inexperienced pilot the courage of the author's convictions.

Dealing first with "O.J.F.S.'s" opening remarks, I must congratulate him upon having hit the bull's eye bang in the middle. I am *not* a pilot, and unfortunately I see no immediate prospect of becoming one. At the same time I am confident that "O.J.F.S." will admit that this has really "nothing to do with the case." I take it that my critic is quarrelling with my views, or, if you like, my statement of fact, in which event my profession, calling, hobby, sport, or regiment cannot possibly affect the issue. Either I am right or I am wrong. Naturally enough,

I am confident that I am *not* wrong, but if "O.J.F.S." can prove me so I shall be gratefully receptive of the information he will incidentally give me, and I will be only too delighted to admit that it is I who am the hugger of fallacies, and not he.

The above being in the nature of the preliminary handshake, the Editor will, no doubt, now give the order, "Seconds out of the ring!"

#### Turning Up and Down Wind.

Now, then!

There is no essential aerodynamical difference between turning an aeroplane "up" wind and "down" wind. Whilst performing this evolution the pilot may, on looking towards the ground, receive different impressions as to what he is doing, as pointed out in the original article in question, but this difference in impressions does not introduce any difference into the evolution, as an evolution.

There is a very sound reason behind the fact that instructors warn embryo pilots not to make turns "down wind" close to the ground, but that reason is far more concerned with what an aeroplane does on the ground than with what it does in the air. When an aeroplane turns it requires more power from the engine if it is to maintain its altitude unchanged; if such additional power is not forthcoming, *i.e.*, if the throttle is not opened up at the moment of making the turn, then the machine will lose a certain amount of height. Since it is flying normally in a straight line some force must be provided to "alter" its "state of motion" (Newton's law), and the only source from which this force can come is the engine. If the pilot, in making a bad turn, loses height to such an extent that his machine is brought to the ground, it is obviously desirable that he shall come to earth at the smallest possible land speed; in other words, it is always far better and easier to land against the wind than with it.

As I pointed out before, whilst the aeroplane is in the air and sustaining itself, it does not recognise any such thing as "wind," provided such wind be of constant velocity, therefore I now say most deliberately that a machine does *not* "stall more easily if turned down than up wind." The real facts of the case are that it is far easier for a pilot to stall his machine in the former circumstance than in the latter by reason of the fact that he goes very largely by earth impressions.



## Flying Facts and Theories.—

Before dealing with the question of momentum which "O.J.F.S." raises, I will deal with his statement that "a machine turning down wind needs less bank than one turning up wind."

If we suppose that this is really the case it brings forward some rather comic consequences. One is that it is impossible to execute a correct turn without knowing the speed and direction of the wind! Another is that if you happen to be flying above the clouds, and therefore out of view of the earth, your turns must consist of a series of grotesque recoveries from positions into which your unfortunate ignorance of the wind has driven you! "O.J.F.S." evidently cannot bank his machine correctly unless he knows something about the speed and direction of the wind; and that wind is not that which is due to the speed of his aeroplane through the air but the good old-fashioned wind which blows over the earth and buffets poor devils, like myself, who cannot fly.

Will "O.J.F.S." tell me how, when he is unable to see any terrestrial objects whatever, he gets to know anything about the wind? And if he does not have such information how he proposes to bank his machine correctly?

## An Analogy.

Whilst awaiting replies to these questions I would take the opportunity of pointing out that the conditions which cover an aeroplane making a circular turn in a wind (presumed to be of constant earth velocity) are precisely analogous to a cyclist riding round a circular track marked out on the deck of a ship; which ship is also presumed to be steaming at a constant velocity relative to the earth.

As the cyclist circles round he is, first, going "with" the ship, then "across" the ship, then "against" the ship, finally, "across" the ship, and so on.

Yet, if his speed remains the same relative to the deck of the ship his banking will remain the same all the way round the circle.

Let the cyclist be pedalling 8 m.p.h. and the ship be steaming 10 m.p.h., when he is riding facing the bow the cyclist has then a total speed of 18 m.p.h., and on turning across the ship must, according to "O.J.F.S.," bank for this speed. When facing the stern of the boat the cyclist has a total speed of  $8 - 10 = -2$  m.p.h. To turn "across" the ship he must make a bank suitable for a speed of minus two miles per hour. Now, there is a pretty problem.

As a matter of fact, the cyclist, being a wise man, does not bother about any such thing as the speed of the ship. All he worries about is his own speed *relative to the ship*, and so long as he keeps up his 8 m.p.h. he knows he need not alter his "banking."

It need hardly be said, I hope, that the banking of an aeroplane and the leaning over of a cyclist whilst turning are exactly analogous.

Just in the same way the aeroplane pilot, when making his turn, need not bother about the wind in which he is flying, always provided that it is constant in velocity, and always provided that his loss of altitude on the turn does not bring him to the ground.

The question of making a landing is, of course, a totally different matter, and does not enter into this consideration, as in this the altitude at which the evolutions are carried out is not a factor.

## Momentum.

"O.J.F.S." suggests that I have apparently forgotten the question of momentum; but a little further thought on his part would surely have convinced him that momentum does not alter my argument one way or another, and for the following reason. Momentum is the product of mass into velocity, and since the former remains (neglecting the consumption of petrol, oil, and water on board the aeroplane) constant, momentum is directly proportional to velocity. Now, as I pointed out in the original article, the only velocity which matters to the aeroplane once it is off the ground is its air speed, and since the air speed in a steady wind is constant, it follows that the momentum of the machine *relative to the air* is also constant. The momentum of the aeroplane relative to the earth is undoubtedly variable, but this only affects the conditions of landing and not the conditions of flying.

Supposing "O.J.F.S." and I are seated in a railway train, I facing the engine, and he with his back to it, and the train is doing, say, 60 m.p.h. Now, if I toss him a box of matches he will in catching it have to resist its momentum. Similarly, when he tosses the box back to me I shall have to do the same. Now, in the first event, the momentum of the box in relation to the earth is proportional to the speed of its flight *plus* the speed of the train, whereas in the second case it will be proportional to its speed of flight *minus* the speed of the train. Yet it is no harder for "O.J.F.S." to stop and catch the matchbox than it is for me; in other words, there is no difference in the momentum of the matchbox as far as we are concerned. Exactly the same argument applies to the aeroplane flying in a steady wind.

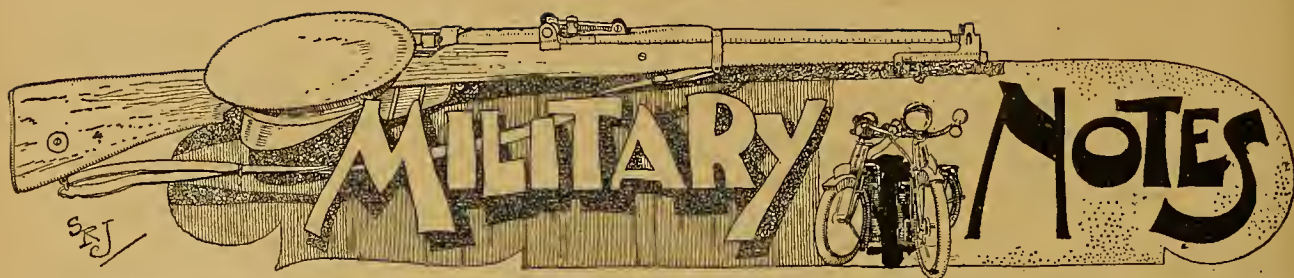
## Centrifugal Force.

Again, "O.J.F.S." introduces the factor of centrifugal force, but this has really no effect whatever in the argument which I put forward. Centrifugal force, other things being equal, is a function of the speed of the machine and the radius of the curve along which it is travelling. In a steady wind, and in a flight path truly circular about an imaginary point in the air (and moving with it), neither of these factors varies, consequently the centrifugal force remains constant.

To take an analogy; let "O.J.F.S." stand in a railway carriage travelling at the good old accepted speed of 60 m.p.h. (how rarely trains do it nowadays!), and revolve, in a horizontal plane, some convenient weight at the end of a piece of string. Now the speed of that weight, relative to the earth, will be alternately increased and decreased by its speed round the centre according to whether it is moving with or against the train. But all the same the tension on the string remains unchanged throughout the circle. In exactly the same way the centrifugal force of an aeroplane remains the same, provided it keeps the same curve in its flight and its air speed is constant.

The above arguments, I think, will be found adequately to meet the criticisms of "O.J.F.S.," and here let it be said that they are purely theoretical, being based throughout on the assumption that the wind is constant in velocity and direction. Unfortunately such winds are rarely encountered in practice, and the effects of variable winds, gusts, etc., will therefore have to be discussed in a future article.





### DANGER IN THE PARKS.

**PTE. VICTOR J. RALPH**, of the Siege Battery Ammunition Column, says he has not missed any "push" that has occurred during the last eighteen months on the British Front in France, and that it is sufficient evidence of the danger to which the A.S.C., M.T., are exposed to know that seventeen lorries were hit to pieces early this year in a square not far behind the lines. He says the trenchmen themselves admit the A.S.C., M.T., do their bit and that their opinion counts.

### A.S.C., M.T., DANGERS.

**SGT. G. TAYLOR**, Cpl. Roberts, and Pte. W. J. Hutchinson, all of the A.S.C., M.T., have written us interesting letters on the question of the dangers to which the A.S.C., M.T., are exposed, and express similar opinions to those which have been published lately. All three letters bear out the reiterated statement that the A.S.C., M.T., unquestionably receive their share of attention from the Boches.

### THE MOTOR CYCLE TO THE RESCUE.

So far as is known, the last two men who brought up the rear of the whole Italian Army in its great retreat were English, being a lieutenant-quarter-master and a corporal, R. A. M. C. They stayed behind at Palmanova till

the last minute trying to save some stores. All around them the town was burning, and the whole population, both civil and military, had left some twenty-four hours earlier. However, they found a horse and harnessed it to a cart, taking the corporal's motor cycle aboard. For some distance they proceeded without difficulty till at last the horse gave out, and for the next eight miles the corporal towed the cart by harnessing his motor bicycle between the shafts. Next they came upon an abandoned motor lorry in running condition, but without petrol, so with what remained in the motor bicycle tank the corporal towed the officer on a pedal cycle which was found by the roadside, and they continued until the petrol ran out. Finally the journey was finished on foot.

### AUSTRALIAN OPINION.

**FROM** Air-mechanic A. S. Roberts, a member of the Australian Flying Corps Squadron now in training, we have received the following interesting comments:

"Since seeing you at your office a while back I have been able to see some of the country which was only a myth as far as we Australian motor cyclists were concerned.

"We have been allotted our machines and have had the good fortune of a few trips, all of which have been enjoyable, seeing realistically those scenes we have

often seen portrayed in your journal, but during those times we never thought we should see them as we now do.

"I cannot understand why you people in this country complain of the roads as they at present exist; we think ourselves in clover by comparing them with the tracks we are accustomed to at home.

"There is one thing which hits me very hard in this country—the home of the sidecar—and that is, under-estimating the necessity of proper alignment of the sidecar outfit.



Cpl. W. H. Elce, R.E. Signals, who is now serving with the Egyptian Forces, will be remembered as the proprietor of the business house of W. H. Elce and Co., Bishopsgate Avenue, and also as a Rudge rider at Brooklands.

"It is really heartbreaking to see an outfit (usually a 3½ h.p.) loaded up with an adult and child in the car, with another passenger on the carrier. Usually there is a can of petrol and luggage strapped to the chassis; then, to cap all, the cycle is sometimes leaning into the car at least two inches out of perpendicular. I am not exaggerating—I have seen such outfits go past our camp many times, but perhaps I am too harsh a critic.

"The photographs enclosed may prove interesting to you. The corporal on the right is H. V. Norton, of Western Australia, and he has done good work on a 2½ h.p. Sunbeam out there.

"I myself hail from Victoria, and we are both members of an Australian Flying Corps Squadron at present in training.

"I wish you and your journal a long continuance, and the good luck and prosperity it has always deserved."



Air-mechanic A. S. Roberts (on left) and H. V. Norton, both from Australia. The good quality of the British roads was one of the things that particularly impressed them.



# A Red Cross Motor School in Switzerland.

A School to Improve the Knowledge of Interned British Soldiers.

ON August 12th, 1916, a batch of about 600 British N.C.O.'s and men, together with about thirty officers, were sent from Germany to be interned in Switzerland. This brought the total of British soldiers interned in Switzerland up to about 1,600, all of whom had been examined in Germany by a commission of Swiss doctors and recommended for internment in a neutral country owing to wounds or illness.

From the first day of the arrival of these men the desirability of finding some form of employment for them was fully realised; most of them being in a perfectly fit state of health to undertake suitable work, and it was realised that during their period of internment the men might be taught much that would assist them in becoming useful and valuable citizens after the war and capable of obtaining remunerative work on their return to civil life.

A suggestion was made by Lt. C. E. Wallis—formerly on the staff of our sister journal *The Autocar*—who had been taken prisoner by the Germans early in the war, that a class should be started at Mürren for the instruction of the men in motor mechanics. This plan was carried into effect by the British authorities, and, thanks to Lt. Wallis's energies and ability, has gone ahead in a most satisfactory manner. At the outset this scheme was heartily supported by Messrs. Piccard-Pictet and Co., of Geneva, who supplied a chassis and other equipment, while the British Red Cross Society advanced money for the purchase of a few tools.

It was realised by Lt. Wallis that to teach the men to drive and to undertake running repairs was not sufficient, and plans were therefore made for providing a thorough grounding in the elements of motor engineering, so that later the men would make efficient chauffeurs or garage mechanics. Preparations were made, therefore, for running the school on proper lines, and the work continued for six months, at the end of which period it became evident that, owing to the lack of facilities at Mürren it would be impossible to make the course so complete as was desired. For instance, lessons in practical driving were impossible, as Mürren has no roads and is on the edge of a precipice—more than 2,000 feet above the nearest byway! Lt. Wallis then obtained the sanction of the British and Swiss authorities to remove his school and pupils to more favourable quarters, which were finally selected at Vevey, where ample room was obtainable close to the lake margin. The new shops were speedily equipped, assisted by the generosity of various firms, among whom the following may be mentioned: Messrs. Piccard-Pictet and Co. presented a complete car for driving lessons, and the makers of the well-known Peters milk chocolate equipped the school with a drilling machine, emery wheel, and complete set of small tools, together with all the necessary shafting, belting, and gearing to drive the machinery.

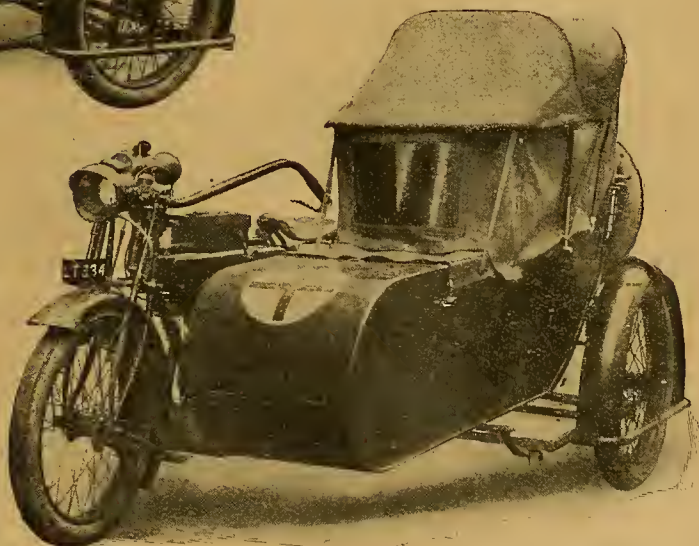
Many of the pupils have since been found civil employment in Switzerland, and *The Autocar* has taken up this worthy cause by opening a subscription list with a donation of one hundred guineas. Many motorists will be eager to assist these unfortunate men by equipping them for following useful employment on their return to civil life, and subscriptions to *The Autocar* Fund should be addressed to the Editor of *The Autocar*, Iliffe and Sons Ltd., 20, Tudor Street, E.C.4.



A sidecar built by the Empire Sidecar Co., for work with the Third Division of the Belgian Army.

## UNUSUAL SIDECAR DESIGN.

A N 8 h.p. Matchless-Jap (Russian model) has been fitted with an ambulance sidecar built by the Empire Sidecar Co. It has a special body so constructed that it will take a patient lying down, and, if the need arise, can protect him completely from the elements in bad weather. The combination has been presented by the Pillar House of Pervyse Fund to the Baroness T'Serclaes and Miss Chisholme in connection with the work of the Poste de Secours Anglaise with the Third Division of the Belgian Army.





# Current Chat

## TIMES TO LIGHT LAMPS.

### GREENWICH TIME.

Nov. 15th	...	...	4.40 p.m.
" 17th	...	...	4.38 "
" 19th	...	...	4.35 "
" 21st	...	...	4.33 "

## Motor Cycles for the United States Army.

The Quartermasters Corps of the U.S. Army has ordered 1,000 additional Harley-Davidson motor cycles, together with 600 Harley-Davidson sidecars.

## Petrol for Officers Wounded or on Leave.

We are informed by the Petrol Controller's Department that short-time petrol licences will be granted to officers on leave from the Front or to officers who are wounded and convalescent. The petrol bought by these licences may be used for any purpose.

## Motor Cycles or Chars-a-bancs?

Several thirty-six-seated motor chars-à-bancs are run by one munition factory near London for employees living in outlying inaccessible districts. They run to a terminus town or village, and set down and pick up workers at points near their homes. A correspondent learns that only two or three are carried on the last few miles. The service necessitates reserve vehicles, drivers, and other labour.

## Where the Motor Cycle Scores.

Each char-à-banc consumes enough petrol to run, say, fifteen motor cycles for a similar journey. The solo mount also conveys its owner by the nearest route direct to his home, and probably

in much quicker time. This is now recognised by munition firms and also the Petrol Board, which is giving consideration to the licence applications of munition workers obliged to travel to and from their work per motor cycle.

## Motor Spirit for Trial Runs.

The question has frequently been asked as to whether it is permissible to give a trial run on a motor cycle which may be offered for sale; and although nothing definite has been decided on this point, Sir Evan Jones is giving the question consideration, and we think that, if it can be proved that the seller is either going to or coming from a trial run for the purpose of a sale, it is unlikely that proceedings will be taken against him.

## SPECIAL FEATURES.

THE TREND OF BRITISH DESIGN.  
MORE 1918 MODELS.  
RELATIVE MOTION AND MOMENTUM.

## The Press in Australia.

New South Wales has now its own motor cycling journal—*The Auto Cyclist*—quite an attractive little production. There seems to be no dearth of gifted artists in the land of the Southern Cross.

## London Motor Cyclists Wanted.

An attractive form of volunteer service for London motor cyclists is opened up by the desire of the Government to establish a despatch service between



certain important administrative departments.

Recruits will be required to volunteer their services for not less than four hours weekly, but the conditions of service are so attractive

that it is expected that many will devote considerably more time to it.

There will be a standing subsistence allowance for the men while they are actually on duty, and running expenses for mileage covered. All the journeys required will be short distance ones of an inter-departmental nature, and the establishment of the service will release many well trained men for highly important work.

Sufficient petrol will be granted the men for their journeys, and also to permit of their going to and from home and the central office.

London motor cyclists and light car and cycle car owners who are prepared to do this little service in the interests of the nation should send in their names to Maj. T. W. Loughborough, The Auto Cycle Union, 83, Pall Mall, S.W.1.

## FURTHER VIEWS OF THE TESTING OF ITALIAN MILITARY MOTOR CYCLES.

The upper picture gives a slight idea of the gradient of the five miles test hill, which was the venue of hill-climbs held in peace time.





**A Warning.**

To those motor cyclists who have not taken the latest Motor Restriction Order seriously we would give a word of warning.

Even though motor cycles are being used for business purposes, there is a likelihood of proceedings being taken if other means of locomotion are reasonably available. It is the fixed determination of the authorities that the provisions of the Order shall be observed with the utmost strictness.

**Inefficient Silencers—Novel Point for W.D.**

C.-S.-Maj. W. Ward, of the M.T. works depôt, A.S.C., was summoned at Bromley for using a motor cycle with an inefficient silencer at Chislehurst Hill on October 18th. He pleaded not guilty. P.S. Farley said the machine was making a loud noise. On examination he found two slits, no baffle-plates, and no means of closing the slits. Defendant told him the machine was standard. Lt. Noble, M.T., said he inspected the machine shortly after. The slits were  $\frac{1}{4}$  in. in diameter and identical to thousands turned out since 1915 and accepted by the War Office.

**Scrapping of Thousands of Machines.**

Lt. Sugden, of the M.T. works depôt, A.S.C., gave technical evidence in support. If the police contention were upheld, he said it would mean the overhauling, and perhaps scrapping, of thousands of Triumph motor cycles now in use by the W.D. The Bench were of the opinion that the silencer did not comply with the regulations, and a fine of 10s. was imposed. Defendant said he

was doing his duty and could not pay. Fined for a similar offence, Cpl. A. Green, A.S.C., M.T., said he declined to pay the fine. Another defendant was allowed a week for payment.

**Sale of Douglas Service Mounts.**

The sale of overhauled Douglas Service mounts and sundry stores and spares recently announced took place at a depôt at Lee, S.E. A W.D. fetched top price. An overhauled 1915 realised £42, and an earlier model £22. A "sporting" model had a three-gallon petrol tank! War Service Triumphs and P. and M.'s figure in the next sale.

**Motor Cycle Allotment Holder's Licence.**

A Kent motor cyclist with a large food plot under cultivation has been granted a petrol licence by the Agricultural Committee, Maidstone. The land is some distance from his home, and necessitates the use of a sidecar outfit, which is also useful for carrying some of the produce to a Red Cross hospital. The owner informs a correspondent that he attributes the grant to his being over military age.

**Government Officials and their Petrol.**

Rumour has it that the myrmidons of the A.I.D. are being refused petrol for the execution of the journeys on departmental business.

We know of some Aircraft Inspectors who are continually travelling from one end of Birmingham to the other in the execution of their work. By motor cycle this has been a possible though by no means easy task. Without a machine we should be inclined to describe their job as simply "cannot be done."

**The National War Relief Funds.**

At the week-end the principal war relief funds stood as follows:

The National Relief Fund (distributed £3,705,822) ..	£6,281,122	0	0
British Red Cross Fund ..	7,932,053	16	3
Tobacco Fund ..	140,000	0	0
King George's Sailors' Fund ..	73,905	0	0

**More Stolen Motor Cycles.**

We are glad to be able to report the capture of a motor cycle thief. Arthur Fuller, 27, mechanic, pleaded guilty before Sir Robert Wallace, K.C., at the London Sessions, to having stolen a motor cycle and sidecar, the property of Charles Duckworth; to having obtained three £5 notes by false pretence from Charles Ward; and to having attempted to obtain by fraud a motor car value £425 from Joseph Seaton.

According to the prosecuting counsel, the prisoner had carried on a regular trade of fraud in regard to motor cars and motor cycles. Many convictions were proved, and the prisoner was ordered twenty-one months' imprisonment.

**Average Prices.**

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	3½ 2-speed .....	—	£42
Abingdon ..	1914	5-6 3-sp. sidecar ..	—	£56
A.J.S. ....	1916	6 combination .....	£108	£97
" .....	1914	6 combination .....	£65	£71
" .....	1916	4 combination .....	—	£57
Allon .....	1916	2½ 2-speed .....	£30	£31
" .....	1914	2½ 2-speed .....	—	£27
Ariel .....	1915	3½ 3-speed .....	£50	£70
" .....	1914	5-6 combination .....	—	£54
Bat .....	1914	6 3-speed .....	—	£16
Bradbury ..	1914	4 2-sp. sidecar .....	—	£40
Brough .....	1916	3½ 2-speed .....	£51	£55
B.S.A. ....	1916	4½ sidecar .....	£64	£60
" .....	1915	4½ sidecar .....	£58	£60
Calithorpe ..	1916	2½ 2-speed .....	£30	£30
" .....	1915	2½ 2-speed .....	£27	£24
" .....	1916	2½ 2-stroke .....	£30	£28
Clyno .....	1915	2½ 2-stroke .....	—	£25
" .....	1914	6 combination .....	£65	£60
Connaught ..	1915	2½ 2-stroke .....	£18	£23
Douglas .....	1916	2½ 2-speed .....	—	£48
" .....	1915	2½ 2-speed .....	£43	£44
" .....	1914	2½ 2-speed .....	£43	£35
Enfield .....	1916	6 combination .....	£77	£90
" .....	1915	6 combination .....	£72	£76
" .....	1916	3 2-speed .....	£42	£45
Excelsior ..	1915	8 2-speed .....	—	£40
H.-Davidson ..	1916	7 combination .....	£90	£84
" .....	1915	7 combination .....	£70	£70
Henderson ..	1916	7 combination .....	—	£100
Humber .....	1915	6 combination .....	—	£60
Indian .....	1916	5 combination .....	—	£60
" .....	1916	7-9 combination .....	£82	£78
James .....	1916	4½ combination .....	£65	£65
" .....	1916	2-sp. 2-stroke .....	£32	£33
Lea-Francis ..	1916	3½ 3-sp. sidecar .....	—	£63
" .....	1915	3½ 3-sp. sidecar .....	—	£58
Levis .....	1916	2½ Popular .....	£25	£24
" .....	1915	2½ Popular .....	£23	£21
Matchless ..	1915	7 combination .....	£80	£81
New Hudson ..	1916	2-sp. 2-stroke .....	—	£28
" .....	1916	4 combination .....	£57	£60
New Imperial ..	1916	2½ 2-speed .....	—	£35
" .....	1915	2½ 2-speed .....	£27	£28
Norton .....	1916	3½ 2-speed .....	—	£53
" .....	1915	3½ T.T. ....	—	£43
P. & M. ....	1915	3½ combination .....	—	£69
" .....	1914	3½ combination .....	—	£51
Premier .....	1915	2½ 3-speed .....	£45	£47
Royal Ruby ..	1916	2½ 2-stroke .....	—	£22
Rudge .....	1916	3½ Multi .....	£42	£44
" .....	1915	3½ Multi .....	—	£42
Scott .....	1916	3½ combination .....	—	£65
Sun .....	1915	2½ 2-speed .....	£16	£12
Sunbeam .....	1916	8 combination .....	—	£75
" .....	1916	3½ solo .....	£70	£76
" .....	1915	3½ combination .....	—	£37
Triumph .....	1916	2-sp. 2-stroke .....	—	£59
" .....	1915	4 countershaft .....	£28	£28
Velocette .....	1915	2½ 2-sp. 2-stroke .....	—	£26
Zenith .....	1915	8 Gradua .....	—	£53

**THE FIRST MOTOR CYCLE IN LEEDS TO BE DRIVEN BY COAL GAS.**

It is the property of Mr. F. Shaw, Beeston Road, who says the container holds sufficient gas to propel the machine with sidecar about eighteen miles. It is interesting to learn that Mr. Shaw finds the wind pressure has but little effect, and he has not noticed any ill effects on the steering.



# THE Critics

## Fireside Chats on Motor Cycle Problems

### GEAR RATIOS.

THE Critics had been discussing the event reported in this paper recently under the heading, "A Sporting Challenge," in which a 4 h.p. single and an 8 h.p. twin competed for speed over a 14½ miles course, finishing in a long test hill, resulting in the twin maintaining a speed 6 m.p.h. higher than that of the single.

"I maintain," said the Novice, "that the only reason why the twin won was on account of its high gear ratio."

"No one is likely to quarrel with you over that," stated the D.R.

"If," pursued the Novice, "both machines had been similarly geared—say 5½ to 1—the twin would have lost."

No one replied immediately. Then the Journalist observed, "That, of course, we cannot say. Had they been similarly geared the event would have evolved purely into a revving competition, and it is quite conceivable that the smaller engine would have triumphed, for the simple reason that the twin would have been robbed of its sole advantage. The test would have been valueless. The ordinary rider is not very concerned as to how fast his engine will turn over. What really concerns him is, how fast will it pull the machine along? It was because the twin would pull a very high top gear, and yet maintain its revs, that it won, i.e., proved itself the more powerful engine."

"Then," said the Novice, "what gets over me is this: The Triumph people fit a 5½ to 1 top gear for sidecar use, and so do the makers of several big sidecar twins. Why have a lumbering big engine if it is to run at the same speed as a small engine, especially when you admit that the small engine is capable of attaining higher revs?"

#### The Use of a Big Engine.

"Why?" repeated the Journalist, looking at the Manufacturer.

"There are one or two reasons," replied the last named. "For one thing, you must remember that when the big twin is loaded up with its heavy sidecar and passengers, its weight horse-power ratio is no higher than that of a solo mount, yet you expect its performances to compare favourably with those of the solo machine, i.e., you want to be able to climb all normal hills with a good reserve of power, and to jog along at 30 m.p.h. on a small throttle opening. If it will not do this, you—I refer to the motor cycling public—are dissatisfied, so the only thing to please you is to give you the same gear ratio as the solo mount, and a larger engine to combat the increased weight and wind resistance."

"But," said the Novice, "I referred to a Triumph with sidecar—not a solo mount."

"Quite right," agreed the Manufacturer. "And it stands to sense that if a big twin requires a 5½ to 1 gear to climb hills, etc., with the same reserve of power as a solo mount, then a single—the Triumph, if you like—requires an even lower gear—say, 6 to 1—if it is to pull a sidecar up the same hills on its top gear."

#### Revving or Slogging Engine?

"That does not necessarily follow," put in the D.R. "I believe a Ford car pulls a 3½ to 1 top gear, yet there are scores of British light cars with much lower gears which will beat it hollow on the road."

"Of course," said the Journalist, "everything depends upon the design of your engine. In present-day motor cycle design the tendency is to use a fairly low gear, and have an engine which will rev. indefinitely, attaining high road speeds by the sheer speed of the engine. The Ford principle is entirely the reverse. This engine is one of the slogging variety, and does not depend on high revs. for its horse-power; consequently, it can pull a high gear."

"I should like to see car practice a bit more closely followed," stated the D.R. "If a big twin will take all hills on its 5½ to 1 top gear, then that merely proves that it is much too low geared for the level, i.e., it is revving its heart out for 90% of the time just for the occasional advantage of climbing a big hill on top!"

"What you want, then," observed the Journalist, "is a very high top gear and a 5½ to 1 middle gear, then to change down on gradients immediately the speed drops below 30 m.p.h."

"That," agreed the D.R., "is my ideal. It is done in car practice. Why not in motor cycle practice?"

"The first and chief reason," replied the Manufacturer, "is that in driving a car with its water-cooled engine you drive normally at a much wider throttle opening than you do a motor cycle. On a long upward ascent, for instance, you may drive miles with the throttle wide open, and thus can manage with the high gear. But you would not wish to do this with a motor cycle—in fact, if you tried it your engine would soon heat and fall off in power, so that you would need a still lower gear before long. With a motor cycle we have less weight per horse-power, and we drive with a lower gear, which enables us to run normally at a very small throttle opening and keep the engine cool."

"That has been our principle hitherto," observed the Journalist. "But surely four-speed gear boxes will alter it? My ideal ratios would be 3½, 5½, 8, and 14 to 1."

#### Wind Resistance.

The Manufacturer shrugged his shoulders. "It all depends, of course, on engine tune," said he. "You would find the average mount in touring trim—whether sidecar twin or solo single—a pretty hopeless proposition on its top gear ratio of 3½ to 1. My present 6 h.p. twins are geared 5½ to 1, and are really very comfortable with that gear. I have many times tried a 4 to 1 top, but always with disappointment. The engine seemed flabby, and entirely lacked that desirable touch of ginger every rider likes to feel, and withal it was no faster on the level. It must be remembered that the wind resistance goes up as the square of the speed, and the h.p. to combat it varies as the cube. Thus the increase in the wind resistance from 30 to 40 m.p.h. is very considerable, and immediately you get above 30 m.p.h. with the 4 to 1 ratio you begin to feel that your engine is slightly overgeared, and in order to hold the 40 m.p.h. you have to run with your throttle pretty well wide open, and the next hill brings down your speed with leaps and bounds. Thus, though your general road speed may be slightly increased, it is done at the expense of feeling that your engine is seldom well on top of its work, and at a marked increase in petrol consumption."

For a moment there was silence. That question of wind resistance had opened up rather an interesting line of thought. "It boils down to this," put in the Journalist, "that, excepting the Gradua and such like, we have to accept a compromise in the way of gears. Suppose your engine develops its maximum h.p. at 2,500 revs., then in order to get the utmost out of that machine your gear ratio should be infinitely variable, so that you could always run your engine at 2,500 revs. That is the ideal. In the Manufacturer's case it is clear that he must travel at, say, 48 m.p.h. ere his engine is running at its best speed on the 4 to 1 ratio. At 30 m.p.h. his engine speed is still low, and every mile now piles up the wind resistance enormously, while it is still a long call to 48 m.p.h. and maximum power. With his 5½ to 1 gear, on the other hand, his 2,500 revs. is reached at, say, 36 m.p.h., so that normally he is running on or about his point of maximum power, instead of having to strain a point and pile up the wind resistance in order to reach it."



# THE 1918 FOUR-CYLINDER HENDERSON.

## Minor Improvements and Revisions in an Interesting Type of Mount.

ONE of the most interesting machines at present on the road is the four-cylinder Henderson—a unique type of mount, which has already proved itself a thoroughly practical proposition. The 1918 model, though departing in no striking features from others we have already described, bristles with small alterations and revisions that unite in the direction of increased strength and durability.

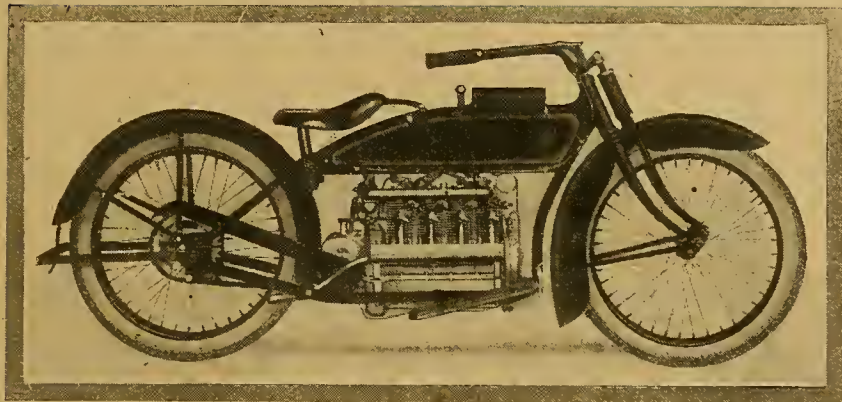
The first alteration to attract notice is the serviceable finish of the machine—all plated parts have been eliminated, the hubs, handle-bars, etc., now being black enamelled, while the mudguards are wider, affording improved protection for rider and machine. The hubs also are heavier and wider than hitherto, with increased bearing surfaces and larger balls.

### Strengthened Spring Forks.

The chief structural alteration is in the design of the front forks, which are now of abnormal strength for sidecar use. Judging from the illustrations, their simple design is to be commended, and it is claimed by the makers that, however appalling the surfaces encountered, it is impossible to cause these forks to bump to the bottom, the resistance of the springs becoming enormously increased as the point of full compression is neared. The bearings in the rocker arms carrying the front wheel spindle would, we should judge, tend to wear oval, and apparently this is the case, as the makers make special note of the fact that easily renewable steel bushes are provided for the pins—a sensible provision.

### Accessories.

The fully armoured Berling magneto fits neatly alongside the cylinders, and



The 1918 four-cylinder Henderson has not undergone any radical alteration, but various detailed improvements have been effected.

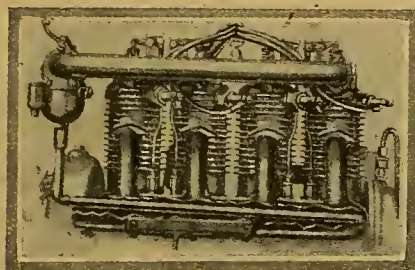
though this position presents compactness we should imagine the magneto would become warmed up if the engine were left running with the machine stationary. The Schebler carburetter,

fuel, assuring perfect vaporisation, even though a heavy grade fuel be used.

### Power Unit.

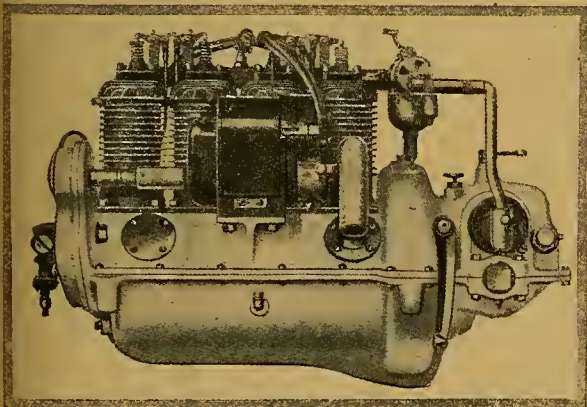
As regards the engine (978 c.c.), the setting of the valves has been slightly altered, and heavier timing pinions are now used. The overhead inlet valve mechanism shows sundry minor refinements. The valves have been slightly lengthened so that longer springs can be employed, thereby reducing the likelihood of the springs seriously losing their tension owing to the heat of the engine, and good provision is now made for lubricating the rockers. The three crankshaft bearings are of unusual width for so small a unit, being 1½ in., 1½ in., and 1½ in. respectively.

The old system whereby extra oil was fed to the engine by hand pump has been abandoned, as it was found that when an extra charge was most urgently needed—as, for instance, when rushing a hill or riding at speed on the level—the conditions were generally such that both hands were required for the bars. By the new arrangement a valve is opened, whereupon a liberal flood of oil drains automatically into the engine, leaving the rider with both hands free to control the machine.

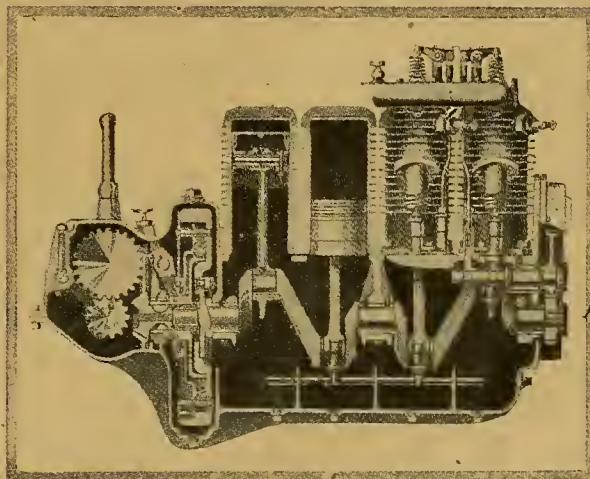


The exhaust manifold, showing hot air pipe to carburetter.

as will be seen from one of the illustrations, draws its fixed air supply through a pipe passing along the entire length of the main exhaust collecting box, so that the pipe is heated to a fairly high temperature by the impingement of the exhaust gases. By this arrangement a blast of hot air is directed across the atomised



Magneto side of the Henderson power unit, showing new waterproof Berling magneto and improved kick-starter.



Cross section of the Henderson engine, showing construction of transmission, clutch, and camshaft.



### The 1918 Four-cylinder Henderson.—

The piston rings are now pinned in accordance with well-tried racing practice, and it is an interesting point that this year very light steel alloy pistons are employed instead of cast iron as hitherto, the refinement, it is claimed, adding considerably to the revving capabilities and rapid acceleration of the engine.

#### Transmission Refinements.

A longer spring is used in this model for the totally enclosed clutch, which, as hitherto, is integral with the flywheel—car practice—and clutch drag has been eliminated by making the plates slightly concave, so that when the pressure of the spring is relaxed they spring apart, thus breaking the oil film. This is an excellent arrangement, and might be more widely adopted in the case of metal-to-metal plate clutches running in oil, clutch drag being commonly experienced with this type, especially in cold weather when starting up. It will be observed that in the case of the Henderson both the clutch and the gear box are fed with

lubricant by the overflow from the engine.

Larger and stronger transmission bevels are used throughout, and the interlocking system, by which it is impossible to move the change speed lever without first operating either the hand or foot clutch controls, has been strengthened and revised.

It is a startling fact that this machine, with its elaborate power unit and numerous refinements, is marketed in the States at a lower figure than is asked over here for certain well-known single-cylinder machines of comparatively simple design.

### A GALLANT I.O.M. STEAMER.

THE many thousands of motor cyclists who travelled to the T.T. races bear varied recollections of the steamers which used to take them across to Douglas, I.O.M.—some pleasant and some very much the reverse. Early this year, one moonlight night, when nearing the mouth of the Seine, the pilot of the

*Mona's Queen*, one of these boats, spotted on the port bow a white stain on the water. He reported it to the captain, who thought it was a French torpedo boat, but the wake of a torpedo coming straight for the old ship convinced him otherwise. He had no gun, and the convoying destroyer was some way off. Fortunately, like other Manx boats, the *Mona* had a large rudder to enable her to turn quickly in the tortuous channels outside the Mersey, and this stood her in good stead, as the captain put his helm hard over and went straight for the U boat, and caught its bow under the port sponson. The paddles were revolving at full speed, and that on the port side gave the submarine a tremendous hammering. There was no doubt about the submarine being sunk this time, as the Hun was seen to sink bow first and finally to disappear with propellers in the air. Despite the fearful crash, the gallant *Mona's Queen* suffered comparatively little damage, but the port paddle had many floats twisted or broken. This story is taken from the French paper *L'Illustration*.

## POPE MACHINES FOR 1918.

### A Typical American Design for the Coming Year.

THE makers of the American Pope are offering two models for 1918—the T18 and the L18. These machines are identical except that the first-named is a three-speed model, while the latter is laid out for solo use, having only a large size clutch with the usual American long hand lever on the left side of the tank by way of easing the drive.

The Pope machines conform to usual American practice in most respects, though a diversion is made in the power unit, which is fitted with both valves overhead instead of the inlet valve only being overhead.

The dimensions of the power unit are 88.5×88.9 mm., and it is claimed to develop 18 h.p. on brake test, which is not bad for an engine of just short of 1,000 c.c.! No wonder it is "the motor cycle with the quick getaway!"

Minor refinements have been made throughout the machine for 1918, the

chief being in the design of the brazed junction lug of the steering head. As will clearly be seen in our illustration of the T18 model, unusual strength is provided at this point, though it would seem that the design tends rather to shorten the steering head, which is undesirable.

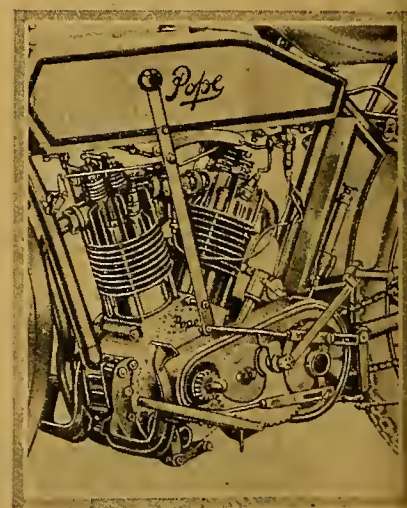
In the single-speed model one is appalled by the chaos of machinery lying exposed near one's left foot. The kick starter arrangement, with its heavy main section and exposed ratchet, is a clumsy piece of work, while there seems also to be an unnecessary number of exposed gadgets concerned in the interconnected hand and foot clutch controls.

#### Unique Refinements.

We are told that the T model is the only motor cycle with its three-speed gear always in mesh, and it is interesting to note that the standard top gear ratio is as high as 3.5 to 1. The arrangement

of the controls is such that, as in the Excelsior, the brake can be notched for holding the outfit on a hill.

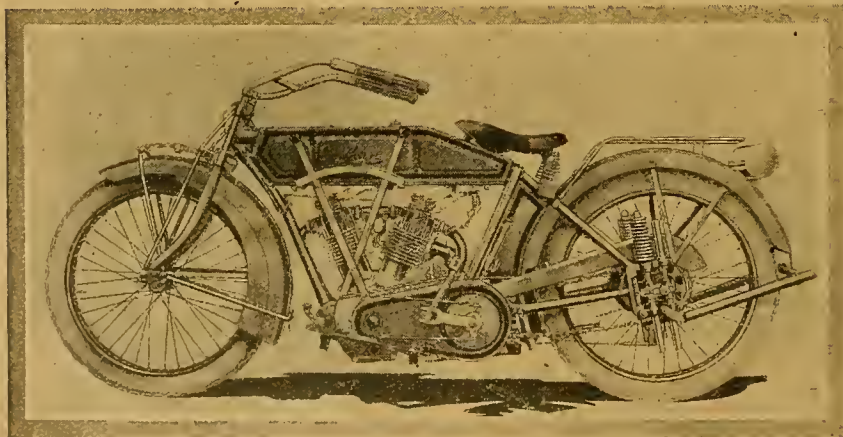
The rear springing, which we have already described, can be clearly followed from our illustrations, the coil springs



Transmission side, showing the exposed mechanism of interconnected clutch controls and kick-starter.

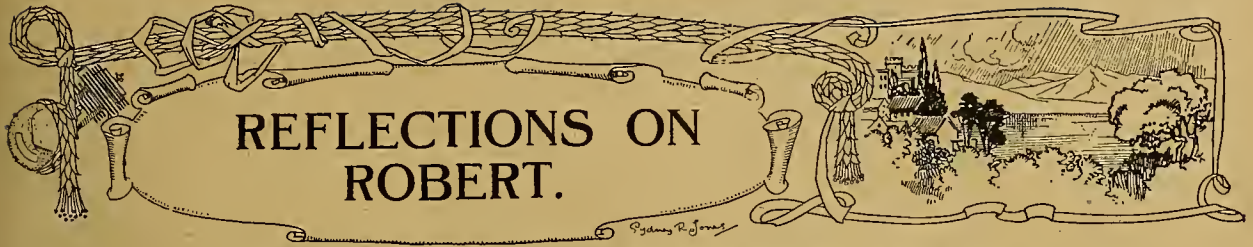
being in tension, while vertical alignment is retained by the stout plungers retaining the springs, and also by a slide carrying the axle.

Very special attention has been paid to the strength of the transmission chains, these being  $\frac{3}{4}$  in. ×  $\frac{5}{16}$  in.—the heaviest chains, the makers claim, fitted to any motor cycle! The makers of the Pope are among the oldest cycle manufacturers in the States.



The 1918 Pope. The capacity of the engine is just under 1,000 c.c., and it is rated by the makers at 18 h.p.





## REFLECTIONS ON ROBERT.

### Police Methods and Policemen at Home and at the Front.

**M**Y hatred for the police was engendered some nine years ago when, at the tender age of fourteen, I started motor cycling. It reached its intensity in July, 1913, when I rode through a police trap for the third time in the month. Gradually, since the war, it has waned in its fierceness.

To motor cyclists at home, even though the majority are forbidden their favourite pastime, "police news" from the Front must always be of interest. For in France and Belgium the "breed" is reproduced. Gone are the blue and silver, gone is the ornament of the cross roads and hedges, but in its place is the military policeman of the khaki apparel, with the little red band upon his sleeve.

The splendour of the London policeman may be noticed in a sergeant of the Military Mounted Police. Dignity that has "held up" Fleet Street is obvious in the even elbows and the straight stiff back of this representation of military order. Woe to the "Tommy" seen minus of equipment, woe to the chauffeur who "double-banks," and woe to the fighting man in rest should he linger too long in an *estaminet*. For the pillar of military order, the B.E.F. "arm" of the law, has his note-book and his pencil as ready as the blue-clad "officer" that he used to be. Year in, year out, he may live in a comfortable billet, may have a *madame* to cook his meals and a charger to carry his ample form. Private Thomas Atkins, the only survivor of his platoon from the last charge through a German barrage, may stay past eight o'clock over his last glass of sickly Flemish beer. "Orders are orders," and the notebook is at once to hand. Thomas returns to his barn with the knowledge that a "Crime sheet" will follow him.

#### A Gentleman's Job.

Yet, though it may seem unfair, in reality it is part of the "game." Thomas knew the time of day, and he knew the Army Order. By lingering past eight o'clock he was deliberately disobeying; therefore, he deserved his fate. The sergeant merely carried out his duty with a fairness that could not have been observed in his actions some three years ago, when with a stop-watch and a mate he trapped motorists on the Brighton Road, being careful, of course, to stand by at the salute when any of his magistrates passed.

The military field policeman, however, has no such "cushy" job, though by comparison with the Infantry or the Artillery it is very comfortable. I remember one fine old Scotchman—he was known as Jock McTavish—who, after two years in the trenches, was posted to assist the military police. I met him on duty at a cross-roads some three miles from the line, and I smiled to myself as I noticed the jerky swing of his arm and the amateurish planting of his feet.

"Yes, sir-r," said McTavish, "it's a gentleman's job, sir-r. Sax 'oors on dooty and eighteen off, and a 'staminy to live in, sir-r. It was bad to leave the boys, sir-r, but I wadna ga back. I could finish the war, here, sir-r."

It was less than a week after this that a "crime sheet" came in to our headquarters. It stated that "Pte. McTavish, J., had been drunk on duty, had refused to obey an order, and had struck his sergeant in the face." Jock got field punishment, and was returned to his battalion. To this day he relates to newcomers the details of his "gentleman's job."

#### Windy Corner.

There is a cross-roads near our line which (to deceive the wily Hun) I will name "Windy Corner." For months it has been a place of peculiar danger, for shells of all types have burst on and around it. One used to avoid it like poison, skirting either north or south. But since the Boche has been driven back it has been out of his "howitzer" range, and has therefore quieted down, and a policeman has been posted to "control the traffic."

Around him, as he stands at his position, is a view that little pleases. A row of trees, now stumps and torn up roots; three "G.S." waggons and a "limber," blown on their sides into the ditch; and a couple of long-dead mules, with their legs pointing oddly to the skies. And the sight of the place is as nothing to the smell thereof!

One day I happened to be motor cycling towards "Windy Corner," and I noticed that the sentry had gone. The place was within easy range of a high velocity gun, and I knew that it received attention. So I opened up quickly and approached the corner at a good speed. As I approached it a policeman jumped out of a shell hole and bellowed at me to stop. "You can't go up there, sir," he cried, pointing with a trembling finger at the road ahead. "They're shelling 't very 'eavy. One round every 'alf-minute, sir." He looked at his watch and shouted, "There's another one due in five seconds!"

He leaped for his shell hole, and, heading off to the right, I let in my clutch with a bang. Before I had gone ten yards came a loud, fierce whistle and a tremendous burst. Smoke clouded round me, earth and stones fell on to my back and shoulders, and small bits of metal twanged on to my machine. But I escaped unhurt, and was a hundred yards down the road by the time that the dust had subsided. Then I turned round to see how my policeman had fared.

He had emerged from his shell hole and was standing on the lip. With a careful eye upon his watch, he was "controlling the traffic," and waiting for the "next"!

G.D.



## MOTOR VOLUNTEERS.

### A NEW APPEAL FOR MOTOR VOLUNTEERS.

**A**t a meeting last week convened by the London Chamber of Commerce and the Motor Transport Volunteer Organisation, Lord French made some very pointed and important statements, and it did not require any great effort of deduction to read in his remarks on the surprises of war that the danger of an attempted invasion of this country is very real. He also made it clear that the work of the Motor Volunteers was much more important than many people realised, and that without the aid of volunteers, should an attempted or actual invasion occur, the situation would be difficult and serious. The primary reason of the meeting was to promote the enrolment of commercial vehicles for national emergencies, and the aim would be achieved if every owner of a commercial vehicle realised, as Lord French himself realises, the value of the Motor Volunteer Corps.

#### Not "Playing at Soldiers."

There are still people to be found who sneer and jeer at the work of volunteers, and not a few motor cyclists have refrained from joining because of this very thing, and there is little doubt that it would be these ridiculous and unpatriotic people who would be the first to claim aid in case of disaster. The talk of "playing at soldiers" is heard less frequently, and when these words of warning have sunk into the minds of every countryman, the sacrifice of middle-aged and elderly motor cyclists, who are willing to bear the training needful, and perform it in all weathers, will be more fully appreciated and realised than it is to-day.

The question of petrol allowance will no doubt be one of the first to be considered by any motor cyclist who, having read Lord French's appeal, thinks of join-

ing a corps of volunteer motor cyclists, and this is a question which the commanding officer of the nearest corps will be able to answer.



#### COAL GAS FOR A SOLO MOUNT.

A method of fixing a gas bag to a solo motor bicycle which has been sent to us by a reader. So far he has not had any great success with the installation, as he has not been working on quite the right lines in connecting up the gas pipe to the carburetter. In the advice we have given him, however, we hope to have found for him a solution of his difficulties.

## THE NEW AIR FORCE.

**W**HAT has been expected and awaited with interest for some weeks now has at last materialised. Mr. Walter Long introduced into the House of Commons on Thursday, the 8th inst., an "Air Force Constitution Act." It has been common knowledge for some time that rivalry and competition between the two Air Services have led to various minor incidents which have, in some instances, delayed the production of necessary material and equipment, and it has been evident that the only way to avoid this spirit of competition was to amalgamate the R.N.A.S. and R.F.C.

By the Act introduced by Mr. Long an entirely new Ministry is set up with the title of "The Air Council," corresponding to the War Office, and having at its head a principal Secretary of State occupying a position similar to that of the Secretary of State for War.

The Act itself is divided into four parts, the first of which deals with the establishment of an Air Force. This Air Force is to be conducted on lines exactly similar to those of the Fleet or Army, and, like the Army, it may consist of various units and corps.

The administration is to be the same as that of the Army or Navy, and, as in the case of sailors and soldiers, the *personnel* of the new corps will be subject to the Ministry of Pensions for questions concerning this item, and any soldier or sailor may transfer or be transferred to the new Force without any loss of seniority or privilege as regards pensions.

Any soldier or sailor already in the Aircraft or Anti-aircraft Branch of the Service may be transferred without his consent, but he has the right of appealing against his transfer. Provision is also made for the creation of an Air Force Reserve, and it is hinted that a Territorial Flying Service may be founded.

The second part of the Act deals with the establishment of an Air Council. The details of this would probably not interest our readers, but we may say that the actual date of its creation is left for settlement to His Majesty by Order in Council.

To all intents and purposes, discipline, dealt with in the third part, is to be the same as that exercised over the Army. The fourth part of the Act states its title, viz., The Air Force Constitution Act, 1917.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Herford Street, Coventry, and must be accompanied by the writer's name and address.

#### MOTOR CYCLES FOR INDIA.

Sir,—As the largest importers of motor cycles into India, we read with very great interest *The Motor Cycle* every week. We shall be glad to receive manufacturers' price lists and catalogues, and any information with regard to trade concerning motor cycles, sidecar combinations, sidecars, and accessories of all kinds.

Calcutta.

WALTER LOCKE AND CO., LTD.

#### AVERAGE SPEEDS.

Sir,—The claim put forward by "E.K." for the standard 499 c.c. Sunbeam machine surely requires some further data before its acceptance becomes general. I believe I am correct in saying that no  $3\frac{1}{2}$  h.p. countershaft three-speed machine has ever attained 75 m.p.h. on the track, to say nothing of attaining this speed on the road. The only  $3\frac{1}{2}$  h.p. countershaft racer capable of high speeds, that I can recall, was the streamline A.B.C. ridden by Emerson on Brooklands. It was, if my memory serves me correctly, a two-speed model and stripped to the utmost.

Particulars of the gear ratio used by "E.K." on the occasion he attained this speed would be interesting, as 75 m.p.h. with the standard  $3\frac{1}{2}$  h.p. Sunbeam top gear ratio means that the r.p.m. must have been extremely high.

How was the speed estimated—by accurate timing or by speedometer? Was the speedometer, if the speed was taken by speedometer reading, an accurate instrument suitably geared for the machine it was used on? In view of the fact that the world's fastest  $3\frac{1}{2}$  h.p. machine, the 79×100 490 c.c. B.S. Norton, stripped, and on the track, can attain only 7.85 m.p.h. more than this particular standard Sunbeam does on the road, the searchlight of publicity should be turned on this machine, for the benefit of engineering posterity.

Capt. Graham Hodgson, in his interesting *résumé* of the A.B.C.'s prowess, omitted to mention the fact that in both racing classifications, the 500 c.c. ( $3\frac{1}{2}$  h.p. T.T.) and unlimited, at the United Services' meeting in September, 1915, his A.B.C. was beaten by the  $3\frac{1}{2}$  h.p. Norton.

A. LINDSAY, M.B.

#### LIGHTWEIGHT GEAR BOXES.

Sir,—I am afraid "Ixion," who generally writes very good sense, is mistaken this time. I am perfectly well aware that the frame of a machine designed to carry a gear box is slightly heavier than that of a single-gear machine; but the difference is only a very few pounds, and does not in the least upset my argument. Suppose, instead of 7% increase in weight when a gear box is fitted, we make a very generous allowance, and increase it to 10%. We have then increased weight of our machine and rider 10%, whereas we have increased climbing power 300%, if gears range from 5-15-1. Nearly all motor cyclists seem perfectly crazed on the question of weight, and seem unable to realise that, within reasonable limits, weight does not count. Every driver of a combination knows that the addition of a passenger on the carrier—say 140 lb., at least—makes practically no difference to speed or climbing power, and yet drivers quibble over a weight of a few ounces or pounds in some fitment, as if it could make any possible difference in practice. A little common sense should show anyone that if the power of a machine is increased double or treble by adding a gear box or anything else which only weighs a small percentage of the total weight, it is well worth fitting. It would be just as reasonable to object to the weight of a 7 h.p. engine as compared with that of one of half the power, as to object to adding the weight of a gear box to a machine. I find

the weight of my Sturmey-Archer gear box, with changing lever and full of oil, is 23 lb. Such a gear box would be none too heavy for any lightweight, and would make it a "go anywhere" machine.

M. HITCHCOCK.

#### ROTARY ENGINES FOR MOTOR CYCLES.

Sir,—Some of the chief points in a recent article in *The Motor Cycle* on rotary engines were as follow:

Accessibility and evenness of torque.

The rotary engine is perhaps slightly more accessible than the stationary, but the rotary engine of, say, nine cylinders is no smoother than an eight or nine-cylinder stationary engine.

When the average motor cyclist is ready to keep an eight-cylinder mount in order then let him think of the rotary engine.

In my opinion the chief thing against a rotary engine is the fact that no rotary engine will throttle down to less than half its normal speed.

LIEUT. R.F.C.

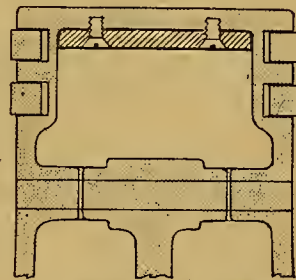
Solihull.

#### COOLING AND LUBRICATION.

Sir,—Referring to the letters from "Engro" and Mr. J. F. Jackson, would not a disc of insulating material attached to the underside of the piston prevent charring of the lubricating oil to a great extent? It, of course, would not prevent the sides of the piston from getting hot, but, as far as my own experience goes, not a great deal of oil is carbonised except under the head of the piston.

H.H.

London, S.E.



A piston having insulating material on the underside of the piston head.

#### CENTRIFUGAL FORCE.

Sir,—"G.R.B." defines the forces which maintain the perpendicular of a cycle as (1) centrifugal force and (2) gyroscopic action of the wheels.

In my untrained opinion, he is wrong, because, as shown by his own illustration, viz., of an ordinary cyclist trying to maintain an upright position when stationary, he finds himself unable to do so, whereas a trick rider can do it.

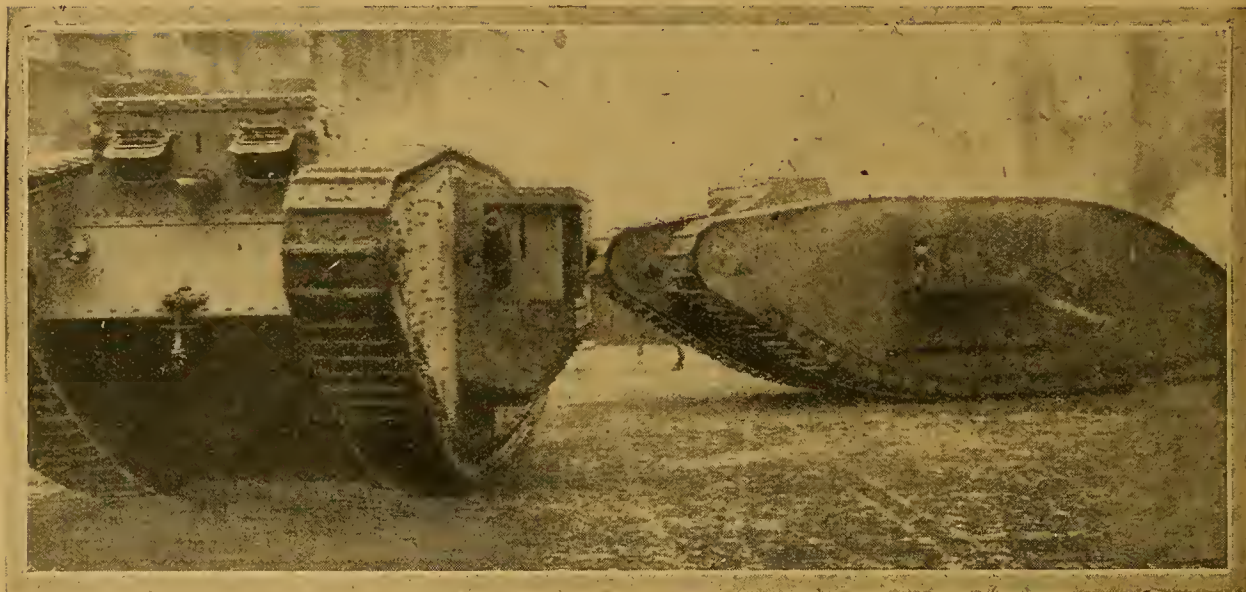
It simply amounts to this (please do not forget it is my humble opinion), that, by practice a rider acquires a quick perception that he is falling away from the centre of gravity, and by skilful movement of his front wheel he regains that desirable centre; when the cycle is moving, even slowly, it is easier to detect and easier to recover, for he then has the assistance of the centrifugal force and the gyroscopic action of the wheels. But it is the mind of the rider which plays the greater part in cycle riding, which in turn is assisted by a mechanical contrivance situated close to the ear and the brain, shaped like a U, and tubular, full of liquid, which acts like a "spirit level," for when one falls towards one side or the other the one half of the U tube receives too much liquid, and thereupon presses on to the brain, informing it that the perpendicular is not being maintained, and the best rider will be the man who has this apparatus the most sensitive.

TOP HEAVY.

Newcastle-on-Tyne.



## MALE AND FEMALE TANKS IN LONDON STREETS.



The star turn of the Lord Mayor's procession on Friday last was doubtless afforded by two real Tanks, which deeply interested the thousands who saw the procession. The "boys" inside appeared to enjoy the procession as much as the spectators, and looked very happy peering through the port holes.

**THE FOUR-CYLINDER MOTOR CYCLE.**

Sir,—In your issue of October 4th I read with great interest the letter of "Olivos." I was greatly struck by the photograph of his converted F.N. from automatic to mechanically-operated overhead valves. I consider the four-cylinder machine on the same lines will be the machine of the future. Therefore I hope to see further particulars in your paper at an early date. (L.-CPL.) S. A. REEVE.

**A SPORTING CHALLENGE.**

Sir,—As this event has now reached its foregone conclusion, some particulars of the single-cylinder engine would be interesting to those of us who have a preference for it. Wherein does this challenging single differ from the W.D. machine in use in France? Differ it must, for I have yet to find the W.D. Triumph that will stand a prolonged fast run solo without breaking an exhaust valve or drying up, to say nothing of the added incubus of a sidecar and passenger. Considering the all-inclusive claim that "Ixion" voiced for the Triumph Co., one would have expected some explanation of Mr. D. Bradbury's concise summary of the most recent public performance of the challenging single.

When peace comes round again I think I know of one machine—a single-cylinder; *the* single-cylinder, in fact—which will be quite willing to take up the gauntlet, now a little moth-eaten, so proudly thrown down.

Cray.

M.B., CH.B.

Sir,—Doubtless you will receive other letters on the subject of the above challenge and the statements made by the participants and the makers of the machines and sidecars. Personally I think the advocates of the 4 h.p. single, good as it is, must have been mad to think it could beat an 8 h.p. twin.

I notice one statement that is likely to be misunderstood. Mr. Brough refers to the outfit he drove as a standard privately owned. Of course, it may be owned privately or it may be the property of a private owner with whom I am not acquainted, but surely Mr. Brough is not himself going to pose as a private owner now, after all these years of open competitions.

Mr. Montgomery mentions the sale of ten sidecars to Mr. Brough for attachment to various makes of motor cycles. These sales do not apparently extend over a lengthy period.

Mr. Brough must have a very changeable mind concerning sidecars or he is still partly interested in the business.

I am not writing in any feeling of animosity, as I have always admired Mr. Brough's wins in pre-war times when I have read about them, but I think he will be willing to admit that his remark about the privately owned outfit is likely to be misinterpreted unless it is a machine he has borrowed for the occasion.

It is a great pity that a semi-private match of this nature is practically always followed by recriminating correspondence, which again proves the necessity for stringent official control in all motor cycle competitions, or any other competition for that matter.

A. READER.

Coventry.

**THE SINGLE V. THE FLAT TWIN.**

Sir,—May "our young gentlemen" be allowed to answer Dr. Patterson? The doctor has read into our last letter more than we intended to convey.

Nothing that has appeared in *The Motor Cycle* since the appearance of our first letter has caused us to change our views, and we therefore still believe that the plebiscite of D.R.'s, as originally suggested by us, would prove interesting.

We leave the matter in the hands of the Editor to decide whether or not the result of the poll shall be published in due course.

The doctor takes exception to our opinion that behind the line is the sphere of the small flat twin.

Would it not have been more convincing if he had produced an argument to prove that we are mistaken than merely to ask a question which was answered by Messrs. Douglas Bros. in your issue of September 20th?

Messrs. Douglas Bros. say: "The authorities prefer, rather than complicate the spare parts organisation, not to change over."

The doctor then goes on to say: "I personally ride the Douglas because it is the more suitable for the difficult and dangerous country where my work lies."

Here the doctor makes the categorical statement that a certain type of machine is the more suitable, whereas we think that this is a matter of individual opinion, and, although we feel qualified to sympathise with him in that his work lies in difficult and dangerous country, yet we personally prefer the single for such work.

Dr. Patterson tells us that we are attempting to set back the clock of progress by championing the cause of the



single, and he bases his argument upon the fact that motor car practice has rejected the single cylinder.

Now the multi-cylinder air-cooled rotary engine has been found eminently suitable as the power unit of the fast scout aeroplane.

Would the doctor therefore urge that the time is already ripe for abandoning the four-cylinder water-cooled car engine in favour of the air-cooled rotary, and that the present retention of the former is an attempt by car designers to set back the clock?

Must not the most suitable type of engine for any specified work depend upon the nature of that work and upon such working conditions as may with reason be anticipated?

Dr. Patterson has chosen to take our correspondence as a personal attack upon Messrs. Douglas Bros. Such was never our intention in point of fact.

We think that the Bristol firm will understand our attitude, which has its foundation in a desire to demonstrate the single's proper sphere.

In the light of our experience, we believe that it cannot be beaten for hard work under unpropitious conditions, and, in this connection, can the doctor tell us why the Hendee Manufacturing Co. are marketing for next year a big single specially for commercial use unless they, too, believe in the single for such work?

In any case Messrs. Douglas Bros. will feel no anxiety for the future of their productions, which have proved their merit at least for the lighter type of work.

The little Douglas can suffer nothing from any words that may be written by persons, so little known in the motor cycle world as

TWO LIEUTENANTS.

B.E.F.

Sir,—I have followed with some interest the discussion in your paper as to the respective merits of the 2½ h.p. flat twins and the 4 h.p. singles used by the B.E.F. in France, as I served for sixteen months as a despatch rider in the A.S.C. in France until I had a severe argument with a motor lorry one night, in which I was the loser. My experience was that the Douglas was by far the most pleasant machine to ride, wonderfully handy in traffic, and wonderfully flexible. The chief faults are the mudguards and carriers, both of which are too light. As for the sphere of the 2½ h.p. being behind the line, as your correspondents, "Two Lieutenants," suggest, I have been as far up the line as most D.R.'s, I suppose; and considering the narrow roads, overflowing with traffic, when one has to be continually dodging in and out and between transport, and when one has often to push one's machine part of the way, and, moreover, sometimes leave the road altogether, I know which machine I would choose. Just as a horse needs daily grooming, so does a motor cycle in constant use need constant attention, and it is no more trouble to look after the twin than the single, provided that one keeps it in order and does not let things get slack. The weight of the machine is the greatest consideration where rough roads and heavy traffic supervene—and that is "right up." How is it, if the big single is so superior for rough work up the line, that field ambulances, which work as near the line as any other vehicle, are accompanied by flat twin motor cycles?

E.W.R.P.

Hull

### THE FIRST MOTOR CYCLE IN IRELAND.

Sir,—Referring to the article in your issue of November 1st re "The First Motor Bicycle in Ireland." I am inclined to think that Mr. Wallen, of Dublin, may not be altogether justified in his statement to the press, as I know that the Hon. Rupert Guinness, when at Cambridge—between 1895 and 1899—had a front-driven Werner cycle, which I myself drove on more than one occasion (without his consent or knowledge). As motor cycles at that time were considered such a novelty, I can hardly think that the machine in question was not driven in Ireland by the owner, in which case Mr. Wallen would be rather late on the scene, seeing that he did not receive delivery of his machine until January, 1901.

If this should meet the eye of Mr. Guinness I am sure he would remember the machine in question, and a line from him as to the points at issue would be of considerable interest, and may decide who was really the first person to drive a motor cycle in Ireland.

As to Mr. Wallen's concluding remarks respecting his machine being the beginning of the British motor cycle industry I say nothing, but I have my doubts. Perhaps someone more in the "know" could enlighten us on this point.

ROBERT SPENCE.

### THE USE OF COAL GAS.

Sir,—As I have just finished reading your leader of November 1st on "Coal Gas," and as a reader of your excellent paper of about ten years' standing, and also a motor cyclist for the same period, may I offer a few comments? I take exception to your statement about the sanction of the Ministry of Munitions. The butting-in tactics of the A.A. have weakened our position considerably, and it is evident that, so long as coal gas is in the experimental stage, no notice will be taken of it; but as soon as we people who use our machines to and from business every day employ coal gas, then the M. of M. will say, "No, you cannot motor in war-time; get off the road!" and forthwith put severe restrictions on us.

The motor unions have most certainly been traitors to motorists, so it is high time they were boycotted altogether and a fresh one started that will look after our interests and see that no injustice is done in the matter of coal gas.

There is, you will agree, not much doubt that the latest petrol restrictions have been brought about by a certain section of the daily press, and amongst them one from this part of the world. These papers have ranted and raved and stormed because a few motorists who obtained their petrol in a legal manner used it. We must admit, unfortunately, that several of our brethren never had petrol licences, and never intended to get them, and these delinquents should have been brought to book before the bulk of the motoring fraternity were made to suffer. We are told there is a shortage of petrol, yet a plumber of my acquaintance was granted, without question, eighteen gallons of fuel for a blowlamp, when two gallons would have sufficed.

I trust *The Motor Cycle* will do all in its power to prevent any injustice being done in the use of coal gas.

Cardiff.

R. M. THOMPSON.

### ACETYLENE ENGINE DESIGN.

Sir,—Referring to the letter of Mr. Robert S. Boswell in your issue of October 25th, we would like to point out that there is to-day no question of experimenting in order to find the proper mixture of air and acetylene and the safe limits of compression when using acetylene.

It is evidently overlooked that acetylene engines have been in use for many years with complete success, and that official data are available in print, giving every detail to be observed and the results of such engines in actual work.

If the matter interests Mr. Boswell or other of your readers, we shall be very pleased to give the actual figures of the running of internal combustion motors with acetylene.

Seeing, however, that owing to the carbide shortage the use of acetylene is prohibited at present for everything except war purposes, and seeing also that as acetylene is a hydro-carbon its use in motors is also prohibited by the Order of the Petrol Committee, we naturally hesitate to take up your valuable space at the present moment. [The restrictions refer to liquid fuels only.—Ed.]

If your readers wish, on the other hand, to study the question with a view to using acetylene after the war, we would like to point out that—although as carbide manufacturers we naturally do so reluctantly—it is hardly advisable to spend much time in investigating this matter, for actual experience has shown that the cost of running an engine with acetylene is always at least twice as high as running it with petrol or petroleum.

It may, however, interest Mr. Boswell to know that the actual tests, carried out by one of the largest gas engine firms in the world, show that the most suitable compression for acetylene is three atmospheres, and that the most economical mixture is one volume of acetylene to 12.2 of air. This mixture, however, does not give the most satisfactory results in actual working, as it leaves a deposit of carbon through incomplete combustion, so that in actual working it has been found necessary to increase the proportion of air.

As regards the danger of acetylene, owing to its wide range of explosiveness, there is very little in this point, for its range is actually somewhat less than that of the water gas so extensively used for gas engines.

CHARLES BINGHAM AND CO.



## EXHAUST POPPET VALVE DESIGN.

Some Suggestions put forward for Criticism.

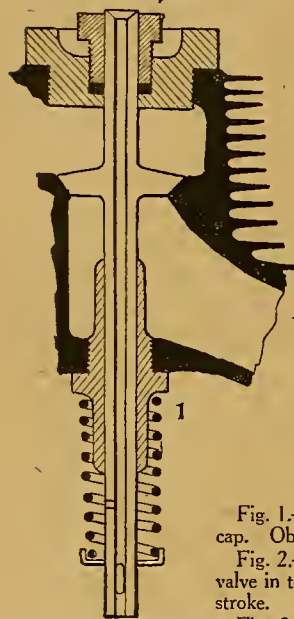


Fig. 1.—Hollow exhaust valve extended through valve cap. Object, circulation of cool air through centre.



Fig. 2.—Hollow exhaust valve, ordinary shape, with air valve in top. Cool air drawn through valve each suction stroke.



Fig. 3.—Ordinary valve with hollow extension piece, and compression release valve fitted to the latter. This would take the place of exhaust valve lifter, and would also provide a means of cooling the head of exhaust valve.

Fig. 4.—Overhead exhaust valve operated by long tappet, taking the place of the ordinary valve stem. The spring would be cooled. The smaller the valve (stem) the less liability to breakage. Also the tension of the spring could be altered at will by means of an adjustable screw head.

Fig. 5.—Same as No. 4, but fitted with air valve and hollow valve stem for cooling purposes.

WITH the exception, perhaps, of the double-beat design of Mr. de Lissa, the poppet exhaust valve at present fitted on petrol engines is the same as that in use seventeen or eighteen years ago. The material of which it is made has been improved, of course.

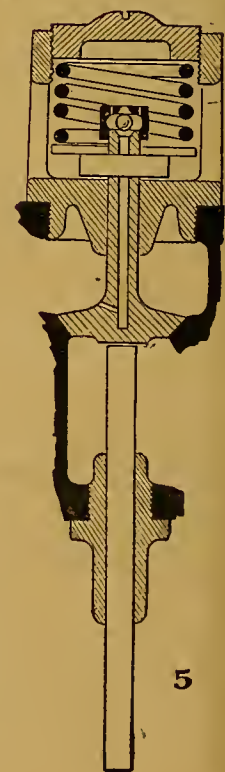
Leaving out of consideration slide valves, sleeve valves, etc., and confining attention strictly to the poppet valve, we may ask if it is absolutely certain that the design of exhaust poppet valves has reached finality. We know that in motor cycle engines it gets very hot—too hot for our liking. We know also that lifting the exhaust valve for the purpose of cutting out is really a vicious practice, causing distortion and pitting of the valve. Again, we are aware that valve springs of any strength are a nuisance to fit, and that the tension of the spring cannot be altered or varied at all, it being necessary in these cases to fit different springs. Further, the valve springs are in most cases exposed to all the dirt and dust of the roads. Taking all these things into account, one cannot allow that the present design is absolutely the best without proof, and in order to

ventilate this question thoroughly the writer has prepared one or two designs for criticism. These may bring forth others, and if, notwithstanding its disadvantages, the present type is proved most satisfactory, at least the case will not have gone by default.

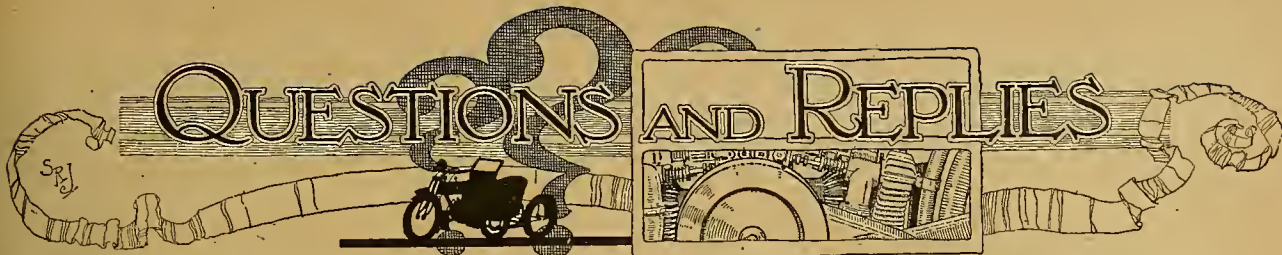
The sketches are practically self-explanatory. They are not intended to be finished designs, and are quite open to criticism, having been prepared with that object in view and to stimulate interest in the subject.

ENGRO.

[We shall be pleased to illustrate any original and suggestive ideas for the improvement of valve design that may reach us from our readers. The designs here given fall short of ideal practice in that the questions of weight and silence in operation do not appear to have entered very considerably into their originator's calculations. A design permitting appreciable weight reduction would tend in the direction of cooler running, and, by eliminating these heat-retaining masses of metal, less negative work would be expended in operating the valves, for lighter springs could be used. These springs, so far as possible, should be insulated from the heat of the engine, and—so the writer of the article points out—accessibility and easy adjustment would mark a new era.—Ed.]







A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

### Gudgeon Pins and Balance.

**?** The gudgeon pins of my 6 h.p. New Hudson were on the slack side, and the makers were unable to make me two owing to their being on war work. I got a local engineer to turn me two. The former two were hollow, and the new ones are solid and weigh about an ounce more. Will the extra weight do any harm in any way?—R.M.

We do not think the extra weight of your gudgeon pins should do any harm to your machine, though, of course, the balance will be slightly disturbed.

### Use of Coal Gas.

**?** Would you inform me whether coal gas has been actually put into use on motor vehicles in this country?—A.F.

Coal gas has been used as a fuel for motor vehicles in this country for a considerable period—certainly for at least two years on the road, and for several years for testing engines on the bench. Its use on a large scale, however, did not become very evident until recently. It is now being adopted by motorists all over the country to compensate for the general shortage in petrol, and it appears to be giving quite satisfactory service with the heavier type of vehicle, such as buses and commercial vehicles.

### Fitting a New Connecting Rod.

**?** I have been running a 1905 3½ h.p. Rex, to which I fitted a magneto in place of the accumulator. On the last run I smashed the connecting rod close to the little end. (1.) Would a cast steel or iron one do? (2.) Would the makers be able to supply one? (3.) Would a steel or brass bush be suitable for the big end, as a phosphor-bronze one cannot be obtained? (4.) The B. and B. carburetter is fitted with a 26 jet, and it takes full air and does not seem to give full power. Would a larger jet be advisable?—H.B.A.

(1.) The connecting rod must be a steel stamping or special alloy. (2.) You can find this out only by writing and asking them. (3.) If you cannot obtain a bronze bush from the makers, then try to procure a piece of scrap phosphor-bronze from a garage and get a bush turned up. This, failing a brass bush, should give reasonable satisfaction. (4.) If the carburetter takes full air only at or near full throttle, then the adjustment is apparently correct. From what you say, it does not appear that a larger jet is desirable.

### Carburetter gets Warm.

**?** I own a 4 h.p. single-cylinder 1914 Bradbury, fitted with a Binks three-jet carburetter. (1.) After running about ten miles I find my carburetter gets very hot. Should this be so? (2.) The crank case gets warm at the bottom and hot where the cylinder joins the case. Does this signify insufficient oil? I generally give the engine one pumpful in five miles. The engine runs very well, and starts at the first kick. (3.) What average mileage should I be able to get out of one gallon of petrol?—A.R.W.

(1.) Yes, the hotter the carburetter, within reason, the better. (2.) The crank case merely gets hot through conduction. The engine is apparently getting plenty of oil. (3.) About sixty-seventy miles per gallon.

### IMPORTANT NOTICE.

#### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

### Curious Mechanical Breakage.

**?** I have a 1915 3½ h.p. three-speed countershaft Premier motor cycle. The machine is all that could be desired as regards its running and climbing powers, but twice within the last six months I have had the misfortune to smash my piston. I use the best oil obtainable—Vacuum B.B., heavy body—and plenty of it, about a pumpful every three miles. Of late I have been using about 25% paraffin mixed with my petrol. Do you think this would cause the trouble? Can you suggest why this trouble should occur and also a remedy?—R.K.

From the symptoms you describe we should imagine you have an excrescence inside the cylinder of your engine, somewhere near the top of the piston travel. Have you taken the precaution of examining the cylinder most carefully for any signs of irregularity that would possibly cause the piston to break? If you can find no signs of anything out

of order on examining the inside of the cylinder, we would suggest that you fit a copper washer about one-sixteenth of an inch thick between the cylinder and the crank case, so as to raise the cylinder somewhat higher, readjusting the tappets to suit. We do not think that the use of paraffin mixed with petrol has anything to do with the trouble.

### Reboring a Cylinder.

**?** (1.) I have a 3½ h.p. Humber cylinder that I want boring out. The present bore is 83 mm. I would like to know if it would stand boring out to 85 mm., as the thickness of the walls seems about ½ in. (2.) Would this also cause it to overheat less? (3.) What would it give if the bore were increased to 85 mm. (I do not know the stroke)?—P.R.

(1.) We think you have made a mistake in the thickness of your cylinder. We are practically certain that it will not stand boring out 2 mm.; from .5 to 1 mm. would be as far as safety would permit your boring out. (2 and 3.) You might get a slight increase of horse-power, but the tendency of the engine to overheat would not be perceptibly affected.

### Gear Adjustment.

**?** My Enfield gear will not stop in high gear, owing, I believe, to the cam being worn. I have dismantled the ball races which take the thrust of the cam, but do not quite see what to do further to get at the cam. Should it pull straight out now, or shall I have to take off the low gear chain wheel?—S.A.

Your diagnosis of the trouble with your Enfield two-speed gear is probably correct, i.e., the top of the cam is worn. Having dismantled the pawl thrust bearing, you may withdraw the cam by turning the gear lever on the top of the tank beyond the low gear position. This will force the cam out, and the withdrawal may be completed quite easily with the fingers. We assume you know that there are three cam faces on this operating cam; and if one is worn, all that is necessary is to turn the piece round so that the second cam face is brought into operation. If, of course, the piece has already been operated in the third position, you will require a new cam, but wear up to this point should not take place until after many thousands of miles running. You will see from this that there is no necessity to take off the low gear chain wheel.



**Pre-ignition and Faulty Plug.**

?

I have a 2½ h.p. two-stroke motor cycle, fitted with a Villiers engine. The engine starts up fairly well, but after running for a mile or so it will slow down and stop. After standing for a short time it will start up and run for a short distance. Everything seems to be in order, and it has just been overhauled and a new piston has been fitted. There is no misting or back firing when it is running.—G.W.W.

The trouble is probably due to pre-ignition, caused by the use of a plug the points of which project too far into the cylinder. Probably the machine will improve after the new piston has become run in.

**A Hole in the Piston.**

?

Whilst decarbonising my cylinder, I noticed a hole in the piston head. It is about the size of a pin's head, and does not go right through. (1.) Can I fill this up with solder, or, if not, (2) what shall I do to prevent it going through?—W.F.K.

(1.) No; solder will not do. (2.) It is unlikely that the hole will become any larger. If, however, it does, and goes clean through, your best plan would be to send the piston to one of the well-known firms of acetylene welders, who could be depended upon to make a thorough repair.

**Overhauling an N.S.U. Gear.**

?

My machine, a 1912 Triumph, has so far been stored away in a good, dry room for the past eighteen months, and as there seems to be no prospect of being able to use it for several more months I am wondering what effect this enforced idleness will have on the magneto, as a friend has just informed me that to keep it in good order it ought to be run occasionally. Is this really so? Also, will you please instruct me how to dismantle an N.S.U. gear to find out if it is much worn? The makers' instructions say that a half-turn of the handle from low gear is enough to give it free engine, but I find about a sixteenth of a turn does it. Is this correct?—A.H.C.

Provided the machine is kept dry the magneto will not be affected in any way. Running the magneto makes no difference to it. The following hints may be of use to you in dismantling an N.S.U. gear: Referring to the makers' leaflet, first remove the cross pin. This enables one to unscrew the sleeve nut No. 22, which has a right-hand thread. Having unscrewed the nut, the gear is free to be taken off, and this is best accomplished by putting two large screwdrivers, one each side of the pulley flange, between this flange and the crank case, and levering off in this fashion. Before the gear is taken apart insert a bar, which will act as a dummy engine shaft. This can then be gripped in a vice, and prevents the balls from falling out. In assembling the gear the balls are put in a race covered with vaseline, and they are thus held in position. The gear is fastened on to the engine shaft by sleeve

nut No. 22. If the gear tends to stick after releasing nut No. 22, it should be tapped off by means of screwdrivers in the manner mentioned. Excessive force must not be used or the flange will break. A sharp tap should suffice. It should be assembled on a dummy engine spindle in a vice. Release the nut with key 38 (left-hand thread) through the slot in the pulley, then adjust the flange to the required position (the flange is No. 1a, and has a right-hand thread), then secure the locknut. It is rather difficult to answer your question. Provided the gear engages properly we do not think it matters how much you have to turn the handle. It may be merely a question of adjustment.

**Inland Revenue Licence Query.**

?

I purchased a 3½ h.p. Rudge-Multi motor cycle a few weeks ago to enable me to get to my home in Coventry at week-ends.

I had the registration number transferred from the person from whom I bought it. I have written for a petrol licence, but have not received one yet. I have now received a full-duty licence form to fill up from the local taxation department. What I wish to know is, am I compelled to pay this tax? If so, is there any reduction, as I have been led to understand that this tax has been reduced to 10s. for the remaining period of this year?—W.H.M.

You are not liable to pay Inland Revenue Duty so long as your machine is not actually in use. If, however, the machine is taken on the road once during the course of the financial year a licence must be taken out for that year. If you have bought the machine since October 1st, or if you have not used it before October 1st, you are liable only for half the tax, i.e., for 10s.

**Removing Worn Brasses.**

?

I am owner of a 1916 8 h.p. J.A.P.-engined twin combination, the big end brasses of which are seriously worn. I should be much obliged if you would tell me how to remove the old brasses. What method is used in a workshop? One mechanic tells me he makes the connecting rod red-hot and the brasses drop out. But this, I think, will probably tend to weaken the connecting rod.—J.T.

The old brasses can usually be hammered or pushed out. Another way to remove the brass would be to get a tube about the same size as the hole in the end of the connecting rod, place this on one side, and on the other side get another tube or piece of brass rod slightly smaller than the outside diameter of the brass; place this in a big vice and screw up, when the brass will be forced out.

**RECOMMENDED ROUTES.****COVENTRY TO MANCHESTER.—H.H.**

Coventry, Stonebridge, Coleshill, Weeford, Lichfield, Abbots Bromley, Uttoxeter, Cheadle, Leek, Congleton, Alderley, Manchester.

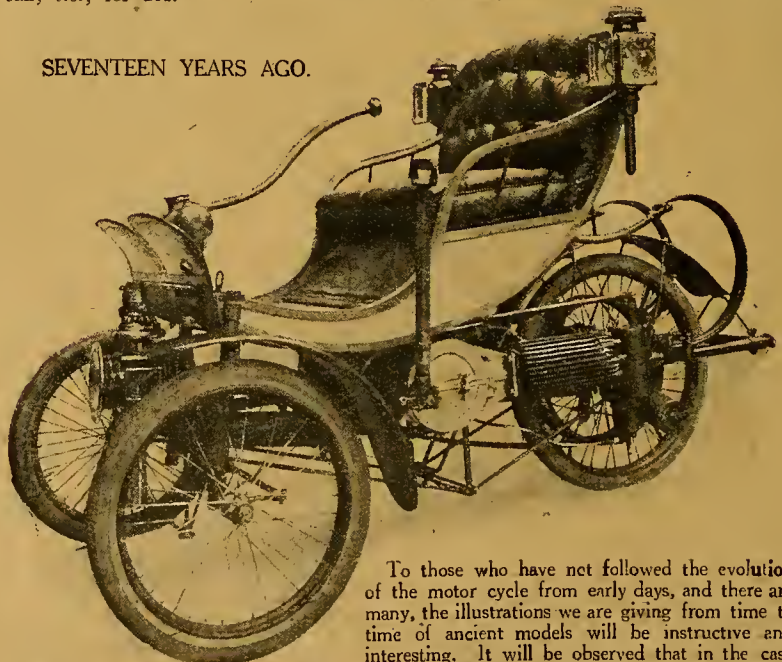
**NEWPORT (MON.) TO WHITCHURCH (SALOP).**

—E.I.

Newport, Usk, Raglan, Monmouth, Hereford, Leominster, Ludlow, Church Stretton, Shrewsbury, Wem, Whitchurch.

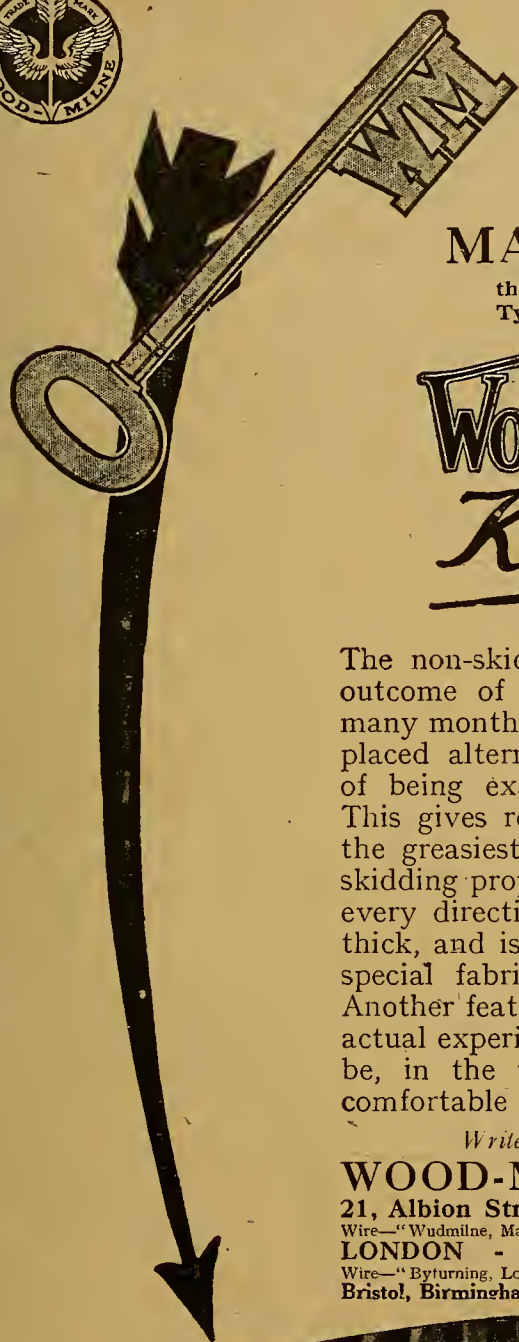
**MANCHESTER TO DUFFTOWN.—W.D.**

Manchester, Preston, Garstang, Lancaster, Kendal, Carlisle, Gretna Green, Beattock, Abington Inn, Symington, Lanark, Newmans, Cumbernauld Station, Stirling, Perth, Dunkeld, Pitlochry, Blair Atholl, Dalwhinnie, Kingussie, Grantown, Inveravon, Dufftown. Approximately 400 miles.

**SEVENTEEN YEARS AGO.**

To those who have not followed the evolution of the motor cycle from early days, and there are many, the illustrations we are giving from time to time of ancient models will be instructive and interesting. It will be observed that in the case of the Humber tricar shown, the flanges of the single-cylinder are horizontal. The carburettor and silencer are fixed together at the cylinder head. Note the graceful line of the body and the old coach-pattern springs. The date of manufacture would be about 1900.





The  
**MASTER KEY**

that locks the door, on  
Tyre Troubles is the new

**Wood-Milne**  
*Keygrip*

The non-skid design of the tread is the outcome of experiments extending over many months. Note how the recesses are placed alternately or 'staggered' instead of being exactly opposite one another. This gives remarkable gripping power on the greasiest or loosest roads. Its non-skidding properties are equally effective in every direction. The tread is tough and thick, and is built up on a foundation of special fabric woven in our own Mills. Another feature worth noting is that from actual experience this tyre has proved to be, in the words of a user, the most comfortable tyre he has yet ridden.

*Write to-day for our latest List.*

**WOOD-MILNE, LIMITED,**

21, Albion Street, Gaythorne, MANCHESTER.

Wire—"Wudmilne, Manchester."

'Phone—City 8774 (3 lines).

LONDON - - - Manchester Avenue, E.C.

Wire—"Byturning, London."

'Phone—City 4797.

Bristol, Birmingham, Belfast, Leeds, Manchester, Glasgow, etc.



MC 301

*In answering this advertisement it is desirable to mention "The Motor Cycle"*

ATQ



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **LIFFE & SONS Ltd., and crossed** & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Liffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### A.J.S.

6 h.p. 1916 A.J.S., solo, in fine condition; what offers?—Bonsfield, Westbury, Wiltshire. [X8446]

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [9668]

A.J.S. 1916 4 h.p. Combination, perfect; £70.—H. Wareing, 182, Portland St., Southport. [1300]

A.J.S. 5 h.p. Combination, complete, lamps, Lucas horn, very good order; £30.—Walsall Garage, Walsall. [X8456]

1914 A.J.S. 6 h.p. Combination, with hood, screen, and all accessories; £56.—Ross, 86, High Rd., Lee. [1294]

A.J.S. 2 1/2 h.p., perfect, clutch model, kick start, 2-speed lamps, tools; £37.—51, Poplar Rd., Edgbaston, Birmingham. [X8220]

A.J.S. 2 1/2 h.p., late 1916 model, 3-speed, and clutch, lamp, horn, etc., excellent condition; £48.—Hopkins, New St., Leebury. [X8462]

A.J.S. Motor Cycles.—We have always a good selection of 1915-6-7 models in stock. Write for particulars.—A.J.S. Specialists, Walsall Garage, Walsall. [X8460]

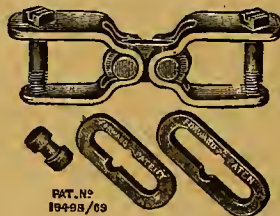
A.J.S. 2 1/2 h.p., 1914, 3-speed, clutch, T.T. bars, head lamps, generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, Gt. Portland St., W.1. [1109]

## FORWARD FASTENERS

Do more than "Answer the purpose"—they, by reason of their unique construction, possess greater strength than is usual and give long reliable service under all conditions.

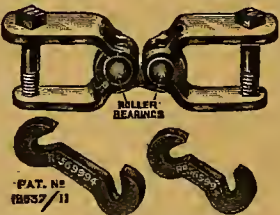
Test them, or write for Catalogue giving full details.

**FORWARD MOTOR CO.**  
85, Forward Works, Summer Row,  
BIRMINGHAM.



PAT. NO.  
19498/69

The Forward, 1/6.



PAT. NO.  
18537/11

The King Hook,  
Detachable, 1/-. Adjustable, 1/3.

**DIXIE**  
MAGNETOS  
AMERICAN SUPPLIES CO. LTD  
162 Great Portland St. London. W.1

**Photography**  
(and FOCUS)

Every Wednesday Twopence.

## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the production of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

A.J.S., 2 1/2 h.p., and Watsonian sidecar, late 1916, 2-speed, kick start, h.b.c. clutch, F.R.S. mag, dynamo lighting set, very little used, tyres as new; £50.—43, Grove Rd., Sparkhill, Birmingham. [1176]

A.J.S. Motor Cycles.—Immediate delivery of special 1917 model, complete, detachable wheels, 700x80 tyres; £91/6.—P. J. Evans, Sole Birmingham Agent, 87-91, John Bright St., Birmingham. [1278]

A.J.S., March 11th, 1916, twin, 4 h.p.; also Rudge 16 g.p. sidecar, all accessories, splendid condition, not run 750 miles, due to owner's illness; £75; seen any time.—Lt. F. W. Muir, Thornbank, Statham, Lynnm, Cheshire. (D) [X8453]

A.J.S. 6 h.p. Late 1915 Combination, hood, screen, spare wheel, 2 new tyres, horn, whistle, Lucas lamps, luggage grid, luggage container, tool kit, overalls, Pillion seat, spares; cost £135 Nov., 1915, owner driven, enamel shows wear, engine, etc., perfect; £100.—Rev. Hatfield, Pleasley Hill, Mansfield. [1205]

A.J.S. 1916 6 h.p. Combination, new Dunlop tyres, Dunhills triple wind screen, luggage carrier, apron, mat, F.R.S. lamps, electric sidecar, Lucas horn, also mechanical (foot controlled), watch, special tank on carrier, complete set new spares, valves, springs, rings, plugs, etc., 10 gallons petrol, first-class condition throughout; cannot use same under new Law; £75.—Croigelin, Moffat Rd., Dumfries. [X8481]

### Alldays.

ALLDAYS Matchless, 1912, 3 1/2 h.p., 2-speed, handle start, Bosch mag, Dunlop tyres, in good running order; £20.—204, Bisleigh Rd., Redditch. [X8490]

ALLON (new), 2 1/2 h.p., 2-stroke, all models in stock for immediate delivery; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1345]

### Ariel.

CROW Bros., Guildford.—Ariel, latest 3 1/2 h.p., 3-speed countershaft models in stock. [1048]

1914 Ariel 6 h.p. Combination, all accessories; a bargain, £41.—Ross, 86, High Rd., Lee. [1295]

FOR Sale, Ariel 3 1/2 h.p., 3-speed; Humberette; both in good condition.—Cooper, Engineer, Romsey. [1196]

ARIEL 3 1/2 h.p., 1913, Armstrong 3-speed gear, clutch, kick start, good tyres, Milford sidecar, perfect condition; £28.—Young, 1, Kaylann St., Whiteinch, Glasgow. [X8345]

ARIEL 1913, 3 1/2 h.p., 3-speed countershaft combination, decompressor, Klaxon, Millers lamps, tools, Dunlop tyres, condition as new; best offer over £37.—Renier, 25, The Green, Twickenham. [1192]

ARIEL 1915 3 1/2 h.p. Conchbuilt Combination, countershaft 3-speed gear, clutch, kick starter, decompressor, new tyres, very little used, as owner (officer) from home; any trial; £60.—17, Ella Rd., Crouch Hill, N.8. [1185]

ARIEL (new), 3 1/2 h.p., 3-speed countershaft gear, clutch, and kick-starter, decompressor, patent spring seat pillar; £72; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1346]

### Auto-Wheels

1916 Auto-Wheel, thoroughly overhauled; £6/10.—Piddoux, Parade, Mervels Lane, Grove Park, S.E.12. [X8167a]

### Bat.

1914-15 Bat-Jap 6 h.p. Combination, good machine, 3 speeds, kick start, new tyres; trial; 43 gns. or solo part—186, Sydenham Rd., Sydenham. [1321]



## MOTOR CYCLES FOR SALE.

## Bradbury.

**BRADBURY**, 3½ h.p., 2-speed, wicker sidecar, excellent condition mechanically; £30.—Gaskell, Kilton Rd., Worksop. [X8370]

## Brough.

**BROUGH**, 1915, 2-speed, 3½ h.p., horizontal twin, only ran 500 miles, like new, Lucas lamps; best offer secures.—King, Chemist, Sutton, Surrey. Phone: 646. [1308]

**1916 Brough**, 3½ h.p., Sturmer-Archer 3-speed gear, clutch, and kick starter, speedometer, horn, lamps, tools, etc.; seen Saturday morning and Sunday; £60.—Mansell, 44, Howard Rd., S. Norwood, S.E. [1190]

## Brown.

**6 h.p. Brown**, 2 cys., powerful machine, 3-speed Armstrong; £25.—Palmer's Garage, Tooting. [1318]

## B.S.A.

**B.S.A.**, 4½ h.p., and sidecar, 3-speed, new tyres, Lucas, tyres, etc., in good running order; £45.—J., 11, Cassilda St., Plumstead. [1326]

**1913 3½ h.p. B.S.A.**, clutch model, lamps, horn, etc.; £25.—Moore's Presto Motor Works, Ltd., Tamworth Rd., West Croydon. [X8420]

**B.S.A.**, 4½ h.p. Combination (Verona sidecar), 1916½, 3-speed, lamps, accessories, as new, mileage 200; 275, or nearest.—80, Oldchurch, Clevedon. [1173]

**B.S.A.** Combination, countershaft 3-speed, fully B equipped, 1914 almost new condition; 45 gns.—Kingston, 2235, Hammersmith Rd., London, W. [1237]

**B.S.A.**, late 1912 model, 3½ h.p., 2 speeds, clutch, B lamps, belt, and tyres new, speedometer, etc., in first-class order; £26; also 3 in. Dunlop belt, 7/6.—Jackson, Beacon View, Parbold. [X8338]

**1915 B.S.A.** Combination, Model H, with Model 2 B.S.A. sidecar, 4½ h.p., 3-speed countershaft, Lucas lamps, speedometer, good tyres, mechanically perfect, done 1,200 miles this year, good condition throughout; £54 cash.—27, Stoke Rd., Guildford. [1254]

## Calthorpe.

**CALTHORPE**, 1917 models in stock, 2 and 4-strokes. Full particulars upon application.—Walsall Garage, Walsall. [X8457]

**CALTHORPE Junior**, 2½ h.p., 2-speed, condition as new, genuine bargain, £17.—Hunt, 83, Pasture Rd., Goole. [X8454]

**CALTHORPE J.A.P.**, 1916, 2½ h.p., 2-speed, best quality Lucas lamp and horn, perfect condition; £30.—H. Grove, Hasbury, Halesowen. [1188]

**CALTHORPE J.A.P.**, 1915, 2½ h.p., Enfield 2-speed, Senspray, lamps, horn, spares, fine condition, fitted auxiliary tank and hot air intake for paraffin; £28; appointment.—13, St. George's Av., Ealing. [1204]

**CALTHORPES**, 2 and 4-stroke models, with Enfield 2-speed, actually in stock, new and second-hand; prices to suit all pockets; only 2% extra for deferred payments.—Wm. Whiteley, Ltd., Queen's Rd., W. [1166]

## Clyno.

**CLYNO** 6 h.p. Combination, 1914, coachbuilt sidecar, fine running order, 2 brand new tyres, spare wheel; £55.—Hillyard, 16, St. John's Villas, Friern Barnet Rd., New Southgate. [1235]

**CLYNO 1915-14** Combination, 5-6 h.p., 3-speed, spare wheel, lamp set, Cowey speedometer, horn, etc., price £59/10; 1914-15 ditto, £62/10; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C. [X3445]

**CLYNO**, genuine 1916, No. 5,012, splendid coachbuilt combination, 5-6 h.p., mag., 3 speeds, 4 detachable wheels, lamps, speedometer, mechanical horn, 700x80 tyres, gift, 6 gns. cash; easy terms quarter down, monthly payments.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [1258]

## Connaught.

**1917 Connaught**, 2-stroke, good condition, all accessories included; £22.—Grantham Lodge, Haddenham Rd., Leigh-on-Sea. [1179]

## Douglas.

**I CAN Supply You with a 1917 Douglas**.—J. Gourlay, Fallowfield, Manchester. [1958]

**1914 Douglas**, absolutely sound, 2-speed model; £34.—173, Tufnell Park Rd., N.7. [1286]

**2½ h.p. Douglas**, 1914, perfect condition; £30.—Gant, 26, Greenholm Rd., Eltham, S.E.9. [1029]

**DOUGLAS**, 1914, 1915, 1916 in stock, many others.—Griffin's, 89, Gt. Portland St., W.1. [19964]

**DOUGLAS**.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [14749]

**1914 T.T. Douglas**, extra fast, lamps, spares; £35.—The Oak, Canuall Rd., Leytonstone, E. [1307]

**DOUGLAS**, 1914, special condition, new tyres and lamps.—Fribbins, 70, Pine Rd., Cricklewood. [1325]

**DOUGLAS**, 2½ h.p., 2 speeds, as new; £28/10.—Flying Officer, 100, High Rd., New Southgate. [X8450]

**DOUGLAS**, 1914, 2-speed, magnificent condition; 36 gns.—Julians, 84, Broad St., Reading. Phone: 1024. [0927]



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## MOTOR CYCLES FOR SALE.

## Douglas.

**DOUGLAS**, 1913 (late), perfect order, Lucas set; £26, with petrol; enlisted.—Letters, Backhouse, Lymington, Havant. [1178]

**DOUGLAS**, prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

**1913 Douglas**, kick and clutch, with lamps and horn, all O.K.; £26/10.—Moore's Presto Motor Works, Ltd., Tamworth Rd., West Croydon. [X8418]

**LATE 1915 2½ h.p. Douglas**, 2 speeds, as new, special accessories, lamps, horns, etc.; best offer over 40 gns.—Greenwood, 9, High St., Windsor. [1229]

**1913 2½ h.p. 2-speed Douglas**, lamps, horn complete, everything in splendid condition; sacrifice £30.—Brooke, 25, Newsome Rd., Huddersfield. [X3502]

**DOUGLAS**, 2½ h.p., 1913, 2-speed, Amac, lamps, accessories, splendid engine, good tyres; £30.—Brightwell, 2, Glassbrook Rd., Rushden. (D) [1322]

**DOUGLAS**.—Prompt delivery of new models to doctors, farmers, etc., against Ministry of Munitions permit.—Motor Exchange, Hortow St., Halifax. [1209]

**1914 2½ h.p. Douglas**, 2-speed, touring bars, foot boards, engine overhauled, excellent order, 2 lamps, horn; £52/10.—Robinson's Garage, Green St., Cambridge. [1267]

**DOUGLAS**, 1914, 2½ h.p., 2-speed, T.T., electric light, perfect condition, fully equipped, few spare parts; £35, or nearest.—Morganti, 18, Woods Mews, Park Lane. [1270]

**DOUGLAS**, 2½ h.p., 1911-12 model, 2-speed, engine lately overhauled, new back tyre, splendid order throughout; bargain, £18/10.—Box L5,062, c/o The Motor Cycle. [1337]

**DOUGLAS**, 1913, 2-speed, kick start, clutch, P. and H. head lamp, Lucas horn, absolutely new condition; letters only; £30.—Douglas, 143, Westminster Rd., Morecambe, W.E. [1232]

**DOUGLAS Motor Cycles**.—We can deliver 1917 Model W on receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol (Wholesale and retail). [09923]

**DOUGLAS**, late 1914, 2½ h.p., 2-speed, T.T. bars, rubber grips, Klaxon horn, speedometer, Dixie mag., fast, good condition; £35.—66, Loughborough Park, Brighton, London. [X8461]

**DOUGLAS**, 1913, 2-speed, T.T. roadster, 1915 cylinders and pistons, complete outfit to run on paraffin, P. and H. set, good condition; £22/10, and good push cycle.—Starkley, 70, Worring Rd., Basingstoke. [1256]

**DOUGLAS**, 2½ h.p., 1915, all black W.D. Model, under 3,000, new rear Hutchinson, auxiliary tank, in good condition; can be seen by appointment; £40.—Lieut. Turner, 27, Burford Gardens, Palmer's Green, N.13. [1257]

**DOUGLAS**, 2½ h.p., 1915, 3-speed model, lamp, generator, horn, speedometer, tools, in splendid mechanical condition; £45; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1343]

**DOUGLAS**, 2-speed, 1915, clutch, kick starter, semi T.T. handle-bars, lamp, speedometer, new belt, and two Palmer heavy tyres, bought new May, 1916, only done 5,000 miles.—Jones, Strudland, Highfield Lane, Southampton. [X8227]

**PRIVATE Owner has for sale**, owing to petrol restrictions, 1916 War Department all-black Douglas, 2½ h.p., best condition, tyres unpunctured, fast, sporty machine, and absolute bargain for £40.—Mineral Cottage, Low Moor, Bradford. [X8404]

**4 h.p. Douglas Combination**, T.T., late 1916, little used, 3 speeds and clutch, Stewart speedometer, C.B. sidecar with lamp, Klaxon horn, tools complete, and spares, 30 m.p.g., and very fast, ideal outfit for business man; inspection invited; £60.—Capt. Reynolds, Q22, Harrowby, Grantham. [X8407]

**1915 Douglas**, 3-speed, all black model, £41; also 1915 special model, 2-speed, £39; 1914 T.T. roadster, new condition, £35; 1914 roadster, K.S., and clutch, Lucas lamps, £35; 1913 T.T. roadster, nice order, £25; 1914 4 h.p., very fast, £40.—Ross, 36, High Rd., Lee. [1296]

**1917 2½ h.p. Douglas**, Model W, hand-controlled clutch, kick start, latest improvements, £54, plus 20%; also Models U and V, 1916 specification, £50, plus 10%; absolutely new; immediate delivery against priority permits for doctors, farmers, war and munition workers.—How and where to apply for full particulars, write the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [1266]

## Edmund.

**EDMUNDS** (new), 2½ h.p. J.A.P., Royal Enfield 2-speed, spring frame, double tank, strongly built machine; £54/12/6; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1347]

## Elswick.

**ELSWICK**, 2½ h.p., 2-stroke, all accessories, Jones speedometer, perfect; £17, bargain.—Hunting, 95, Duckett Rd., Harringay, N. [1287]

## Enfield.

**NEW 1917 Enfield** 3 h.p. Twin, with special light sidecar; £68.—Stradling, Newbury. [1251]



## MOTOR CYCLES FOR SALE.

## Enfield.

ENFIELD, 1916, 3h.p., full accessories; any examination or trial.—8, Percival St., E.C. [X8226]

ENFIELD, 2½h.p., 2-speed, 2-stroke, 1916 model, perfect order, complete lamps, horn, tools; £35.—below.

ENFIELD, 1917, 2½h.p., 2-speed, 2-stroke, practically new, run only 700 miles; £38.—Bateheler, Clarence St., Kingston-on-Thames. [X291]

ENFIELD, 3h.p. twin, 1916 model, practically equal to new; 40 gns.—Julians, 84, Broad St., Reading. Phone: 1024. [X9228]

1913 Enfield Combination, hood, screen, speedometer, lamps, horn, spares; £38.—4, Thornton St., Kempston, Bedford. [X264]

2½h.p. Enfield, 2-speed twin, with lamps and horn, etc.; £21.—Moore's Presto Motor Works, Ltd., Tamworth Rd., West Croydon. [X8419]

ROYAL Enfield, 2½h.p., 2-speed, 1917, new condition, not done 500 miles; £35, bargain, cost £42.—Abbott, Blind Works, Barnstaple. [X8583]

ENFIELD Twin, with coachbuilt sidecar, only run 100 miles; what offers?—Portman Garage, Portman Mews North, Portman Square. [X8219]

3h.p. Enfield, 1914, 2-speed, chains and Dunlop tyres new, splendid condition; what offers?—41, King Edward Rd., Walthamstow, London. [X1184]

ENFIELD 1916 Dynamo Combination, splendid condition; £98/10; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C. [X8446]

ENFIELD 6h.p. Combination, Lucas dynamo lighting set, mechanical horn, speedometer, hood, and wind screen; £95.—Terry, 80, Baneroff, Hitchin, Herts. [X342]

ENFIELD Combination, 1916, new condition, hood, lamps, wind screen, speedometer, Bosch, fully equipped; for quick sale £75.—76, Lordship Lane, E. Dulwich, S.E. [X262]

ENFIELD 1916 6h.p. Combination, new condition, little used, original tyres unripped, extremely economical, with 214 accessories, 78 gns.—Turville, Grosvenor, Margate. [X175]

2-STROKE 2½h.p. Enfield Cycle for sale; cost £47/10 Sept., 3rd last, only travelled 350 miles; will accept £44, complete with lamps and all accessories.—Silk, Redditch. [X1172]

ENFIELD and Sidecar, done 100 miles, 1917, new Whitenside, perfect condition, all lamps, Stewart alarm; what offers?—Chambers, 726, Romford Rd., Manor Park, E. [X1183]

LATE 1916 6h.p. Enfield Combination, with all accessories, brand new condition throughout; cost over £100 August, sacrifice 75 gns.—Brooke, 25, Newsome Rd., Huddersfield. [X8501]

ENFIELD 6h.p. Combination, bought late last year, in fine condition, £8 just spent on new set heavy Dunlops, all accessories; offers over £80.—Onaway, South Heath, Gt. Missenden. [X8224]

1916 6h.p. Enfield Combination, Lucas dynamo lighting, hood, screen, speedometer, horn, mirror, spare petrol tank, sidecar, disc wheel, spares, splendid condition; £100.—Turner, 15, Plane St., Hull. [X8403]

1915 Enfield 6h.p. Combination, hood, screen, lamps, mechanical horn, disc, E. and B. Pilot, mirror, original Palmer tyres, mileage 2,000, in perfect condition; accept £75.—H.B., 36, Glenfield Rd., Nelson. [X8390]

ROYAL Enfield 6h.p. Combination, new August, 1916, done 3,500 miles, engine spares, 700x80 extra heavy Palmer cord tyres (new), machine in first-class condition, no lamps, etc.; £80.—H. White, Hanson Terrace, Wakefield. [X8217]

ENFIELD 6h.p. 1916 Combination, Palmer cord light car tyres all round, large head lamp, generator, rear lamp, luggage carrier to sidecar, very nice condition throughout, and fully equipped; £82/10.—Advertiser, 156, Gt. Portland St., W.1. [X7904]

ROYAL Enfield, 6h.p., late 1914, with 1917 improvements, coachbuilt, and repainted sidecar, Tansad pillow seat, 3in. tyres, engine and everything perfect, speedometer, etc.; £60; after 7 p.m.—H.D.S., 119, Coldharbour Lane, Camberwell, S.E. [X219]

1916 6h.p. Enfield Combination, Palmer cord combination cover on back, back rest, P. and H. head, side, and tail lamps, 2 generators, Gramophone horn, all tools, Cowley speedometer, Lucas mirror, all like new, used only 1,500 miles; spot cash £82/10, no offers.—Moore's Presto Motor Works, Ltd., Tamworth Rd., West Croydon. [X8416]

ENFIELD Combination, 1916, condition perfect, fitted with hood, triple wind screen, car head and rear light, 3 generators, speedometer, watch, mirror, Stewart warning signal, spare Palmer cord cover, 3 inner tubes, spare driving chain and 2 spare gear chains, full set tools and other accessories, all tyres nearly new, a splendid outfit; 95 gns.—Inverness Lodge, Popes Grove, Twickenham. [X8405]

ENFIELD 1916 17 6h.p. Dynamo Combination, hood, screen, speedometer, 105 gns.; also 1916 ditto, £105; also 1916 standard model, sold new May, 1917, with hood, screen, speedometer, quite like new, ridden only 300 miles, £115; also 6h.p. combination, condition perfect; also 1916 6h.p. combination, with all accessories, beautiful condition, £78/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [X242]

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10. MATCHLESS, 1915, J.A.P., 8 h.p., 3-sp., coach Sidecar ..... 69 gns.
11. NEW HUDSON, 1915, 6 h.p., 3-sp. countershaft, coach Sidecar ..... 59 gns.
12. NEW HUDSON, 1914, 4 h.p., 3-sp. countershaft, coach Sidecar ..... 37 gns.
13. PREMIER, 1915, 3½ h.p., 3-sp. countershaft, coach Sidecar ..... 47 gns.
14. RIDGE MULTI, 1917, 3½ h.p., sporting Sidecar ..... 58 gns.
15. TRIUMPH, 1916, 3-sp. countershaft, coach Sidecar ..... 79 gns.
16. TRIUMPH, 1914, 3-sp., coach Sidecar ..... 45 gns.
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BRITISH Excelsior, 1917, 8h.p. J.A.P., Sturmeys 3-speed countershaft, coach sidecar, many accessories, fully guaranteed; cost over £115; 88 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [X1556]

1917 American Excelsior, 7-9h.p., 3-speed combination, dynamo electric lighting outfit, electric lights, electric horn, Stewart speedometer, special large Montgomery Lounge sidecar, a perfect combination, new July, done 800 miles.—Hopkins, 68, Gordon St., Wolverhampton. [X8463]

## F.N.

6h.p. 4-cyl. F.N., Bosch, Amac, new Palmer tyres, like new throughout, all accessories, etc.; £15, bargain.—Nelson, 470, Wandsworth Rd., London, S.W. [X1332]

## Harley-Davidson.

HARLEY-DAVIDSON, 1916, mag. model, Swan sidecar, speedometer, lamps, excellent condition; £90.—Gaskell, Kilton Rd., Workop. [X8368]

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for Harley-Davidsons; P. and H. lamp sets, specially made for H.D., £23/3, carriage paid. [X9256]

HARLEY Combination, 1915, mag., special De Luxe Empress sidecar, unsaturated, everything in splendid order; £60, lowest.—Englemere, Laleham, Staines. [X1255]

1917 Model Harley-Davidson, splendid condition; £115; Swan sporting sidecar; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C. [X8441]

1917 Harley-Davidson, 7-9h.p., 3-speed, dynamo lighting, klunk klunk, double-seater sidecar, in fine mechanical order; £135.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [X1354]

HARLEY-DAVIDSON Combination, 1915, electrically equipped, aluminium disc wheels, all sound, hood and screen, etc.; £75; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C. [X8440]

HARLEY-DAVIDSON, 1915½ model, Montgomery sidecar and apron, mileage 5,800, aluminium plates, run London to Birmingham return 3½ gallons; seen by appointment.—Pugh and Sons, Government Contractors, New Barnet. [X8221]

HARLEY-DAVIDSONS (three) actually in stock, 1915 H.D. combination, one 1916 electric model, also expectations of another 1917 new combination.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [X1245]

LATE 1915 Harley-Davidson, 7-9h.p., standard touring model, electric lighting set, horn, etc., very fast, and in perfect condition throughout, done under 2,000 miles; £60, or would consider exchange with reliable small car, 2-seater coupe preferred.—Lient, Page, R.F.C., Beauchamp, Hants. [X8401]

## Henderson.

HENDERSON, 1915, 4-cyl., 10h.p., coach sidecar, disc wheels, smart turnout; 79 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [X1353]

## Hobart.

1916 Hobart, 2½h.p., 2-speed, 2-stroke, just like new; £27/10.—Moore's Presto Motor Works, Ltd., Tamworth Rd., West Croydon. [X8417]

## Humber.

HUMBER 3½h.p., 3-speed, 1914, lamps, etc., perfect order; £30.—Crabtree's Garage, Wisbech. [X8119]

HUMBER, 3½h.p., 2-speed, in good condition; £18.—Harold Fry, Moorndon Nurseries, Bournemouth. [X8415]

HUMBER, 3½h.p., 2-speed, and coach sidecar; £29/10.—Motor Exchange, Horton St., Halifax. [X1210]

1914 3½h.p. 3-speed Humber, lamp, etc.; £35, cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [X8683]

HUMBER 3½h.p. Flat Twin Motor Cycles, four brand new latest models in stock.—Crabtree's Garage, Wisbech. [X8118]

## Indian.

INDIAN, 7-9h.p., clutch model, fitted with spring saddle for passenger; £38.—Apply, 3, Grosvenor Rd., Church End, Finchley. [X1234]

LATE 1915½ 5h.p. Indian Combination, handle control, foot clutch, 3-speed, perfect; £65.—L.W., 14, Mayfield Villas, King's Rd., Aldershot. [X1248]

INDIAN, 1914, clutch model, very carefully used, low mileage, in exceptionally good condition, smart, fast machine; £37.—Bent, St. Gail, King's Rd., Teddington. [X1174]

1916 Powerplus Indian, 7-9h.p., Model F, spring frame, with standard Indian £21 sidecar, tyres and all like new; £77, or exchange late Scott combination, cash adjustment.—Hynes, Lismore, Ireland. [X8395]

7h.p. 1916 Powerplus Indian, electric lamps and horn, 3-speed, very fast, perfect condition, spring frame, speedometer; £55; exchange good Triumph or Sunbeam combination.—190, Privinity Rd., Oxford. [X1272]

INDIAN Powerplus 1916 7-9h.p. 3-speed Combination, 73 gns., rare bargain; actually in stock; condition perfect, lamps, horn, speedometer; also late 1915 7-9h.p. clutch model, plating and enamelling perfect, £55.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [X1243]



# THE MOTORCYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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## Waste of Petrol.

THE daily papers that shriek aloud at the very thought of a hard-working breadwinner taking his wife out in a sidecar combination for a breath of fresh air at a week-end, take very little notice of waste of petrol on the part of the Services.

One of the worst cases of this was brought to notice by a correspondent in a letter appearing in our issue of Nov. 8th. He mentions, it may be remembered, that near his place of residence many tins of petrol are washed ashore, and, instead of this valuable flotsam being collected and saved, the coastguards cut the nozzles of the cans, empty them, and throw them back into the sea. Can any more outrageous and disgraceful procedure be imagined?

Unfortunately, this is not the only case of which we have heard of petrol being wasted by the Navy, but in that corps of the Army in which more motor vehicles are employed than any other—the M.T.—we are happy to be able to state that petrol is no longer wasted, at least, that is the case so far as the principal home depots are concerned, as we have lately had several opportunities of personally investigating their internal working arrangements.

It is clearly the duty of the Government to accumulate enormous stocks of petrol, sufficient to supply both present and future needs. The latter, of course, will be considerable, as the increase in the use of aeroplanes will mean a far greater consumption than has taken place hitherto, but if there is any left over it should not be thrown into the sea or used unnecessarily, but should be rationed to the private individual in the same manner as other necessities.

The case we referred to above, if it is really as serious as our correspondent leads us to believe, should be reported to the local M.P., who should call the attention of Parliament to the matter. We also doubt if the coastguards have any legal right to destroy petrol tins which are washed up by the waves, as all flotsam and

jetsam thrown on property privately owned belongs to the lord of the foreshore, whose territory extends as far into the sea at low tide as a man riding a horse can throw a javelin.

## Extraordinary Export Figures for October.

A NOTICEABLE feature in the export figures of motor cycles for October is the remarkable increase recorded. According to the Board of Trade returns over a quarter of a million pounds worth of motor cycles and parts were sent out of this country during October, this amount being nearly double of any month's figures during the war or previous to its outbreak. The exact amount is £268,269. By its way of comparison it is interesting to note that in May, 1914, the amount was £126,233; August, 1914, £125,860; October, 1915, £64,825; October, 1916, £105,410. The big figures for last month may be accounted for, of course, by large batches of motor cycles being despatched to Russia. Hitherto, many of the orders for the Allies were sent in Government boats and were not counted in the Board of Trade statistics. But if this be not the case and the figures represent goods despatched for ordinary Overseas trade, then the increase is quite extraordinary.

At this time it is futile to harp continually upon the oft-told tale of American enterprise, and of the indifference of English manufacturers to the Eldorado that awaits them Overseas. Perhaps this month's figures will convince a few of the pessimists that the spirit of enterprise is very much alive, nor is it needful for "dead heads" to take the figures as showing the amount of work which might have been expended on the making of munitions. It is hardly necessary to repeat that we want men and money to win the war, and to obtain money we must have trade, and Overseas trade at that, for the export trade is the essential foundation and basis of the wealth of Britain.



# Despatch Riding in German East Africa.

## Combating the "Askaris" and Malaria.

**A** DESPATCH rider in this part of Africa has a great many difficulties to overcome. Sandy tracks for miles at a stretch, newly cut roadways through the "bush" (jungle), sandy roads covered by coconut palm, and sandy roads covered by branches of trees are all in the day's work, and then there is fighting malaria and dysentery.

When a D.R. has a long run to do, he takes his rations, blankets, mosquito net, spares, etc., as he passes the night at or near his destination and returns the next day. We always ask him if he has made his "will," and can we have this or that of his kit. On his return we give three cheers, and should he be late he is informed that his kit has been divided, as we made sure the German "askaris" (native soldiers) had sniped him. When despatches are to be taken one hundred miles or more, they are always carried by relays.

The longest ride I had to do was one hundred miles, and I left at 9.30 a.m., arriving at my journey's end at 6 p.m. Some D.R.'s have had as many as 250 miles to do, and no roads—nothing but native paths—to use.

The roads (so-called) used are either hard and very bumpy or sandy, which makes it necessary to do a lot of foot work. I may say that a B.S.A. machine with kit, etc., on the carrier needs a lot of keeping up in deep sand. There is a very long, sandy hill covered by coconut palm stems to prevent the wheels of a motor lorry from sinking, and a D.R. finds it very rough and trying to ride over these palms. I do not know which is the worst riding, up or downhill. These palms are laid across the roadway for three or four miles at a stretch. There are sandy tracks stretching as long as thirty miles, and one can imagine riding in bottom gear all this distance, the magneto at times ploughing through the sand, and the belt often coming off. One must ride with a slack belt, or else the spokes go. On one much used road it is a common occurrence to see twenty to thirty cars either stuck or in difficulties in the sand.

Some of the worst tracks to ride over are newly cut ones made through the bush. What with tree stumps, holes, spruits, etc., it is a great game steering a motor cycle along these cuttings. Many of these tracks run through dried up swamps, and one may imagine what it is like after elephants have been waddling in these swamps (when wet) and leaving the impression of their tiny feet. One has to ride over these holes, dodging always the tree stumps; the holes are 15in. to 2ft. deep. Whilst riding through one of these swamps, I had both of my footrests broken off, and only another thirty-seven miles to go.

The natives out here (slow thinkers and slow movers) have a habit of imagining they are on the wrong side of the road whenever a rider approaches, and across the road they start moving at the wrong time and wrong pace.

E.M., R.E.



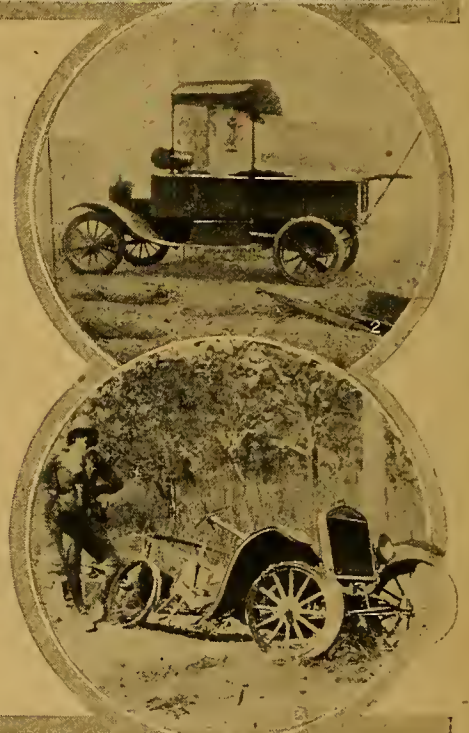
(1) About to leave for a fifty-mile run. Sleeping quarters of the D.R.'s in background.

(2) A weary driver asleep under the mosquito net on the top of a light lorry.

(3) A motor lorry burnt through a load of petrol catching fire.

(4) D.R.'s having "chukula" food in temporary quarters in the "bush."

(5) About to join a "column." The D.R. on the left was captured by the Huns.





# Occasional Comments by "Ixion"



## Trenches and Benches.

THE following, from the address, "In the Line," speaks for itself: "Have you, my dear 'Ixion,' ever heard a 5.9 coming towards you, when your heart stops beating, and you lie on your face in the mud? Have you ever hidden 150 yards from a bridge which is being shelled and timed the rounds before making a dash on your Triumph? You pick your time, snatch up your bicycle whilst 6in. fragments of the last burst are still falling, and as you cross you catch the mesmerising roar of the next crump on its way, and just as you get over hear the sing of the bits, which may be anything from the size of a split pin to the size of a magnet? Have you crouched in a dugout during a shellstorm, knowing the whole show may go west any minute, when even the stoutest-hearted go yellow, and none dare speak?"

## A False Comparison.

I ADMIT I was wrong in attempting any comparison between the fighting men and the shellmakers.

There are plenty of comparisons which one cannot make, and especially when they involve generalisations. For example, who has the better of it, an infantry private in the first wave of a push, or the general behind at army headquarters who directs the push? Nobody can say. If the general is a man with any human sympathy, his is an awful job; it is his duty to send so many men to death, and his crime if he wastes a single life which wiser tactics could have saved. The strain he bears is wholly mental and physical; the strain which the private bears is largely physical. In so far as there is any comparison between the fighting men and the shellmakers, the shellmakers unquestionably have by far the easier job. I had no right to do more than indicate two features in the lot of a patriotic munitioneer, for which he commonly receives no sympathy. The first is that his job is unhealthy and dangerous to life in many cases, and was particularly so during the earlier phases of the war. The second is that when we turn to moral elements the soldier has the better of it. Whatever the fighting man has to bear, however he may eventually die, he keeps his self-respect; he has offered everything that he has to give: he is without reproach. We rejected stay-at-homes may have a right to our self-respect, but we are not conscious of it, or comfortable about it. We live in the greatest crisis of all history, and we are not permitted to play a real man's part in it. We are sleeping in beds, and sure of our meals, and receiving our usual money—perhaps more than our usual money—and we feel unhappy about it. We feel we would gladly change places with the men in the line. Very possibly if we were there we should wish ourselves back in Coventry or Birmingham. But there it is; we envy the fighting man just as much as he can ever envy us, and there we must leave it. The fighting man's sense of duty and self-respect have buoyed him up in many an hour of

trial, and he can probably understand why many of us who are the wrong side of the Channel in this business would give a lot to change places with him.

## "That's Torn It."

THIS simple slang phrase just about expresses the latest petrol situation. I am fitting a sidecar on each side of my Baby Levis. In each sidecar I shall carry an Admiralty buoy. Each buoy will be charged with coal gas. The nett maximum average speed of the outfit will be 15 m.p.h. Ten minutes of each hour will be spent in refilling the buoys. The actual optimum average will therefore be—mathematical readers please oblige with the correct figure. And I shall blithely call my resultant progress "motoring." Ugh! On the whole I think I had better dye my grey locks, lie heavily at a recruiting office, and try to swizzle my way into the M.T. or some other arm of the Service, where petrol may be legitimately consumed.

## No Hurry about Gas.

FORTUNATELY, the equipment of a sidecar outfit for gas fuel is far more economical than that of a light car: and as we need not risk a large sum upon the conversion, we can afford to take chances about which car owners must hesitate. But the simple fact is that the gas outlook is none too bright. In some localities gas is already refused to us. If there is a real petrol shortage, as we must suppose, it may not be long before engine builders are ordered to test and run their engines on coal gas. Thousands of householders are fitting up gas stoves to relieve themselves of anxiety about coal supplies in the cold weather. The A.A. has elicited the fact that the Government will not allow gas fuel to be used in steel compression cylinders, and that the authorities have not pledged themselves to permit the unrestricted use of gas fuel under all conditions. I question whether joy-riding on gas may not soon become as unpatriotic as joy-riding on petrol has long been. In the meantime, we none of us want to use much gas during the winter, and by Easter the situation should have cleared up.

## Average Speed.

I SPENT a very "windy" hour musing on "The Critics'" opinions the other evening. I was seated in a car which has a maximum speed of 40 m.p.h. The night was dark and misty. The lamps were duly dimmed at Dora's behest. An elderly sportsman was at the wheel. The route measured twenty-eight miles. The roads were narrow, greasy, and twisting, with numerous blind corners and not a few cross-roads. We covered the distance in slightly under the hour. Now if an elderly sportsman can do an average of close on 30 m.p.h. over unfavourable roads on a slow heavy 'bus in the dark, what can a reckless young idiot average on excellent roads in broad daylight on a 70 m.p.h. Brooklands Norton?



## SPRINGING DEVICES

Recent Patents intended to Provide better Springing for Front and Rear Wheels.

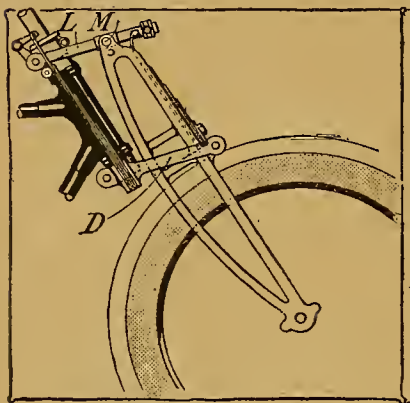
CERTAIN items or topics in questions of motor cycle design remind one of the dormant volcano. Periodically an outburst occurs, and one of the most numerous examples of these outbursts is the topic of springing as applied to a frame—sometimes to the frame as a whole, but more often to one of the wheels. A collection of recent patents

on the cantilever or semi-cantilever principle. As will be seen on reference to the illustration, there are two horizontally pivoted arms, one at L and one at D, the rear portions of which are pivoted to the steering head, while at the front of the lower of these two arms is pivoted one of the leaf springs. To this leaf spring is attached the front member of the forks holding the wheel, and the top of these forks slides by means of a guide along the upper horizontally pivoted arm. It will be seen that this arm L may oscillate vertically, receiving its checks from one of a pair of leaf springs attached at their bases near the crown. Thus the guide M mounted at the top of the forks may slide horizontally along the shaft L under the control of the front leaf spring, while the shaft L itself may, as already stated, oscillate vertically under the control of the two leaf springs mounted at either side of the steering column. Such a design offers several novel departures from standard practice, but, of course, is limited to front wheel springing.

Mr. W. W. Douglas has been devoting his attention for some time to the question of rear springing. In his patent a compound spring works in a horizontal plane between the saddle and the bottom bracket. The rear portion of the frame is pivoted at the bottom bracket, so that it may oscillate, and a kind of double saddle tube is provided, the two members of which are connected by means of the compound spring. Above this spring, on the usual saddle tube, is fixed a guide, in which the rear frame tube C may slide; consequently when the machine is on the road the back may oscillate round the pivot D, the extent of its motion and recoil being controlled by the compound spring.

Messrs. Downs and Tonks have also turned their attention to rear wheel springing on somewhat similar lines by means of a compound spring, but their spring differs from the Douglas in that it works in the vertical instead of in the horizontal plane, and is placed in front of and in the same plane as the saddle tube. It will be seen on reference to the sketch that the spring is attached at the bottom to a lug braced on the saddle tube, while at its upper extremity it is attached to a triangular piece which, at its apex, is pivoted to a lug

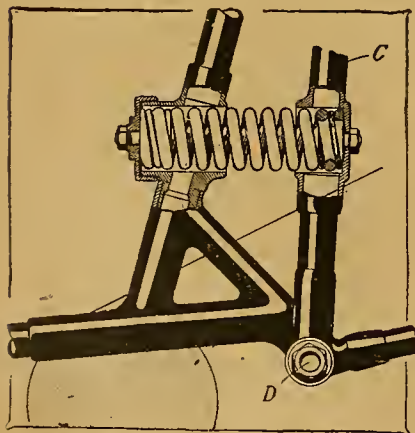
braced on the seat-pillar tube, and at its other angle is attached by means of a pin to the back stay of the frame. The chain stay of the



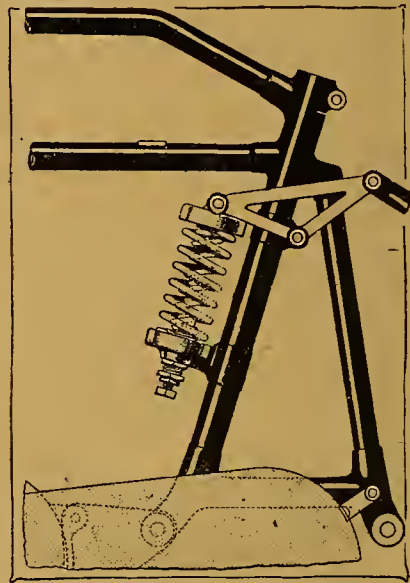
A front wheel springing system patented by Lt.-Com. Phillips.

reveals some very interesting ideas in this direction, and what appears one of the simplest, and probably one of the most promising, front wheel springing systems is that patented by Lt.-Commander Phillips.

This consists of a spring fork operated by three leaf springs allowing of horizontal as well as vertical motion, the springs themselves being attached either

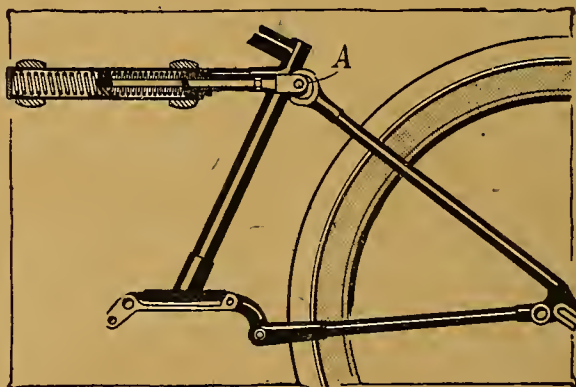


A recent Douglas patent—comprises a compound spring between saddle and bottom bracket.



Messrs. Downs and Tonks's latest patented rear wheel springing device.

frame is, of course, affixed in the ordinary position near the bottom bracket, but in such a way that it may oscillate on its bearing. Thus, as the machine travels the back wheel may move in a vertical direction relatively to the main frame, its motion being controlled by the compound spring attachment forming the subject of this patent.

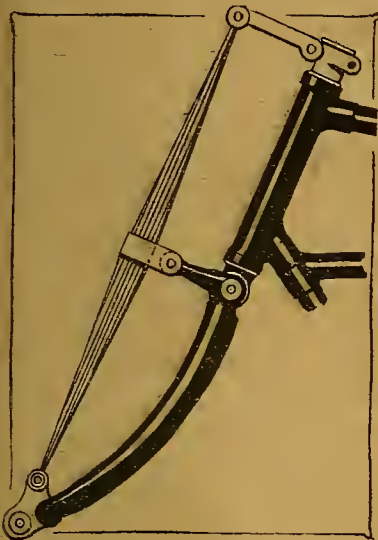


A patent in connection with the James Cycle Co., showing considerable ingenuity and originality.



## Springing Devices.—

The James Cycle Co., Ltd., have adopted a quite novel method for obtaining rear wheel springing, and reference to the sketch renders the system quite clear. On each side of the tube underneath the tank is placed a cylinder containing springs and a plunger, this



A design of front fork springing patented by Messrs. Biggs and Baker, of the Precision Works.

latter being attached to the wheel stay as shown in the illustration at A. The chain stay is pivoted at the bottom bracket, as in most of the other examples we have described; consequently the wheel may oscillate on this bracket, the extent of its oscillations being controlled by the vibrations of the plunger attached to the wheel stay at A, which, in turn, is controlled by the springs in the cylinders.

Messrs. Precision Works, King's Norton, Birmingham, have introduced two systems that strike a note of novelty. The illustrations of the front wheel springing arrangement are easy to follow. It will be seen that a laminated spring is arranged parallel with the head firmly fixed at its upper end, while the other

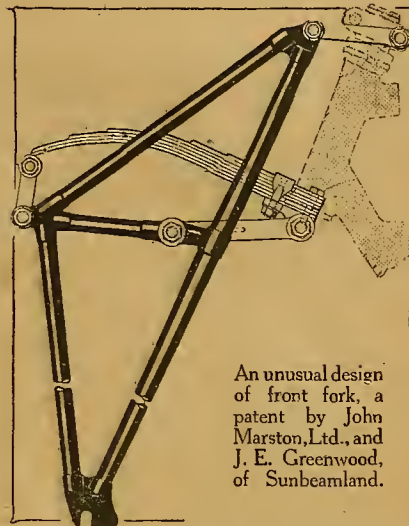
end of the spring is attached to the front of the fork near the wheel hub. In the middle of the spring is a bolt that is attached to the crown of the fork, and at this end the actual fork enclosing the wheel is also pivoted; consequently the effect of road shocks is to compress the laminated spring, which, on yielding, allows a certain amount of rotary movement to take place round the pin on which the fork is pivoted to the crown. The rear wheel springing device again employs a laminated spring, which is placed at the rear of the seat-pillar tube. The action of this spring is shown in the two sketches, and it will be seen that the spring may be given a permanent set, so that it occupies normally the position shown in fig. 2, or it may be made straight so that it occupies normally the position shown in fig. 1.

The action of the type of spring shown in fig. 2 is fairly obvious. The chain stay is pivoted at the base of the down tube, and the spring, being attached at its centre as well as at its base to the down tube, enables the rear portion of the frame to oscillate round the point A, the top portion of the spring approaching nearer to the saddle. The type of spring illustrated in fig. 1 really consists of two springs, the ends of which, when in motion, vibrate on either side of the saddle-pillar, each end of each spring being attached to the two fork ends.

What strikes one as a very substantial and workmanlike job is the production of the Sunbeam Company. It will be seen that the road shocks are absorbed by a leaf spring which is pivoted at the crown of the motor cycle steering pillar, and at the other end it is attached by means of a shackle to the specially constructed triangulated fork. A fork of this type should be of great strength and rigidity, but, of course, special care will be necessary in the equipment of the pivot bolt at the crown head, as this bolt would undoubtedly be subjected to very considerable horizontal shocks.

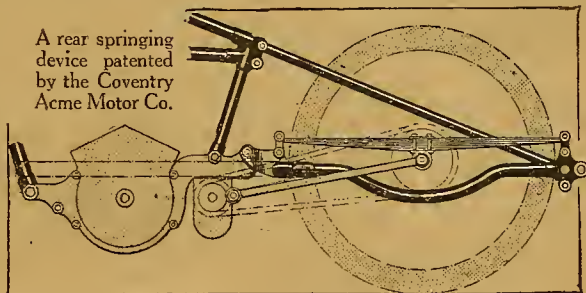
Our last design—that patented by the Coventry Acme Co., Ltd.—illustrates what is practically the car principle of

springing applied to a motor cycle rear wheel. It will be seen that a rigid frame is carried beyond the rear wheel, and from the extremity of this frame to some-



where in front of the rear wheel is slung an ordinary flat leaf spring. Springing of this type necessitates the use of a radius rod, and this is clearly shown in the diagram, being attached to the wheel

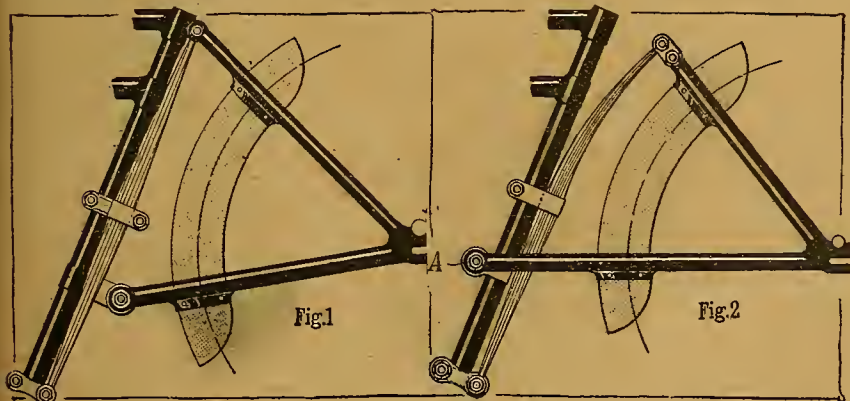
A rear springing device patented by the Coventry Acme Motor Co.



or to the spring near the hub of the wheel at one end, and at its other extremity attached to a pivot to a specially placed bolt near the gear box. Judging by the satisfactory service given by this type of springing on cars, the results on a motor cycle should be quite satisfactory if the analogy holds good.

Many correspondents have from time to time urged the unsatisfactory nature of most existing springing systems, and it is to be hoped that some of these correspondents will find satisfaction in one or two of the foregoing designs. One of the easiest things for the critic to say is why can we not have something really original instead of a fourth rate adaptation of a design already found wanting? and many a critic says little more than this. Such criticism will certainly not apply to all these new designs, and the freshness and originality displayed in many of them are distinctly encouraging.

They are, of course, not all perfect, but all seem to have been evolved in a spirit of departure from the conventional, and as such they augur well for the future development of the motor cycle along lines not yet overworked.

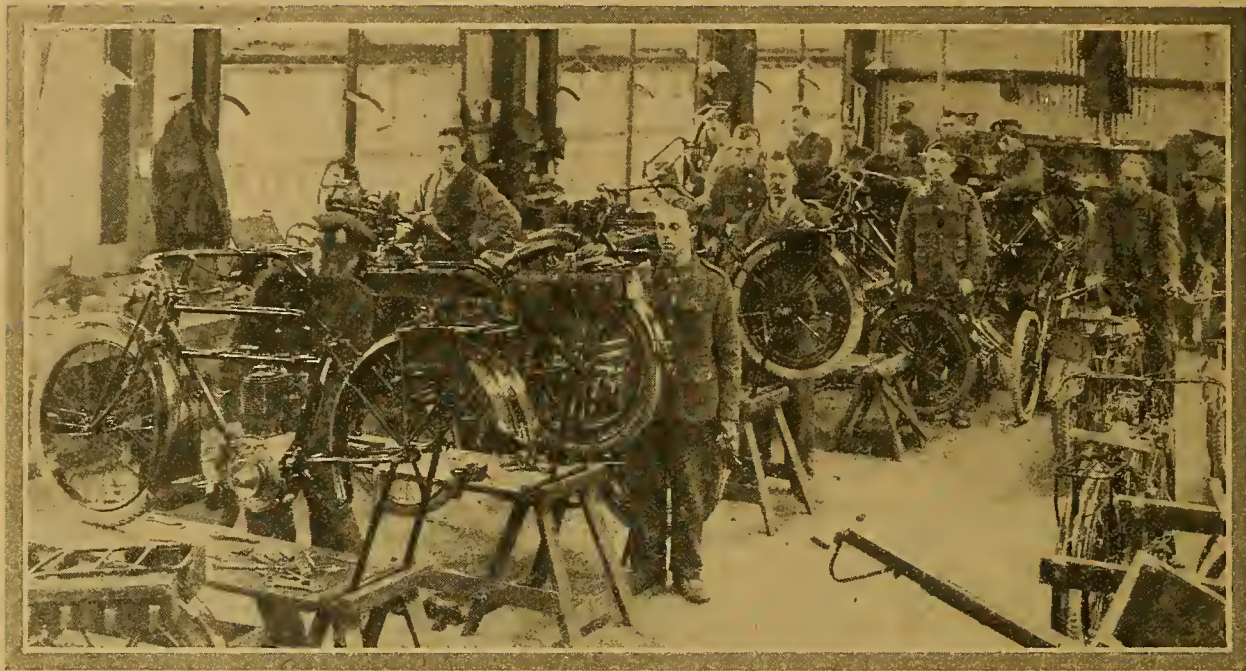


The rear wheel springing device emanating from the Precision Works. The action of the laminated springs is clearly shown.



## IN THE DOCTOR'S HANDS.

Examination and Repair of Motor Cycles in an A.S.C. Mobilisation Camp.



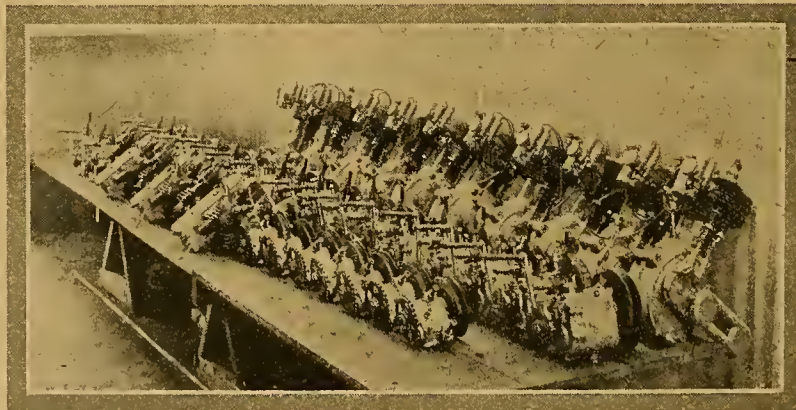
The erecting shop.

ON three previous occasions we have in *The Motor Cycle* dealt with the great work of the Army Service Corps, more especially as regards motor cycles. The first article—"The Cauldron of War" (issue of June 14th)—gave an account of the battered war relics received at a depot in the Metropolitan area; the second, entitled "Motor Cycles for the Front," described the great camp where all motor cycles, new or repaired, were received previously to being sent to the various units; while the third—"From Scrap Heap to Complete Motor Cycle"—told how, from shapeless masses of scrap iron, machines were restored to almost new condition. We now propose to deal with yet another depot, many miles away from these previously described, where the repairs are a comparatively small part of the work done, as here men and machines are prepared for their journeys to the various fronts. It is, of course, well-known that the

Army Service Corps employs a number of motor cyclists as despatch riders, who accompany convoys, and carry out repairs for all corps using motor cycles, except the Royal Flying Corps, which, so far as transport and repairs are concerned, is self-contained.

### Building the Works.

At the beginning of the war the camp was a comparatively small affair of which the M.T. was but an insignificant portion, but since then it has grown to an extent which must be seen to be realised, and the most wonderful part of it is that all the building, the roads, and preparation of the ground preparatory to building, have been carried out by the Army Service Corps men who pass through the camp in process of mobilisation. The natural surface is grass, but as there is a bed of a pre-historic river quite near by, the stones from this are carted up and dumped down to a depth of nine



Triumph and Douglas engines and gear boxes in the test shop, after having undergone a thorough overhaul.



**In the Doctor's Hands.—**

inches, then rolled down, and finished off with a top dressing of gravel, with the result that a hard dry surface is obtained. The principal square which existed before the war has been treated with tar and the surface is excellent; in fact, quite like asphalt. Such work before the present war could only be carried out by the Royal Engineers, but owing to the technical knowledge of M.T. officers, among whom may be counted some of our greatest automobile engineers, it has been done not only in a most efficient manner, but also in such a way that the public funds have not been expended to the extent they otherwise would have been.

As regards the motor vehicles, most of these are travelling workshops, lorries, steam and petrol, for the M.T. (supplies), and also for the heavy artillery. So far as motor bicycles are concerned, these—mostly Triumphs and Douglasses—are issued to the units which are being mobilised, and a considerable amount of motor cycle repair work is done. The depot has its own staff of despatch riders, complete with their little workshop, and these are kept busily employed.

**Repairs and Rebuilding.**

The motor cycle section is in charge of a lieutenant, one of the oldest racing motor cyclists in the kingdom, who raced at Canning Town when Harry Martin carried all before him on the old Excelsior, and Jack Crundall was the Humber champion. Under the supervision of this technical expert the repairs to all motor cycles and the rebuilding of machines that have been evacuated from Overseas are carried out. These latter have all to be stripped so that any latent faults may be detected, and are then dealt with so efficiently that when finished it is difficult to tell them from new. The accessories are renovated at the same time. In peace time, we are told, it is doubtful if it would

be worth while undertaking such work, as the cost of the labour expended would be so high, but under the present circumstances, as the labour is available, it has been found to be the most economical and satisfactory way of dealing with the problem.

The number of machines turned out per week averages twenty-one at the present time, and the output is increasing. The work is carried out by fifty-three non-commissioned officers and men in workshops occupying 5,000 square feet floor space. Certain motor cycle repairs are effected in the four-wheeled vehicle departments, such as repairs necessitating machine tool work, the repair of saddles and toolbags, and despatch box painting. Apart from this the motor cycle section is self-contained.

When the machines are received they are stripped as already described, subjected to a very thorough examination, and all defects are made good. The engines have to undergo an electrical power test on the plant shown in one of our illustrations, and they are not passed unless a certain standard of efficiency has been attained. The machines are then re-enamelled and re-assembled, and those of

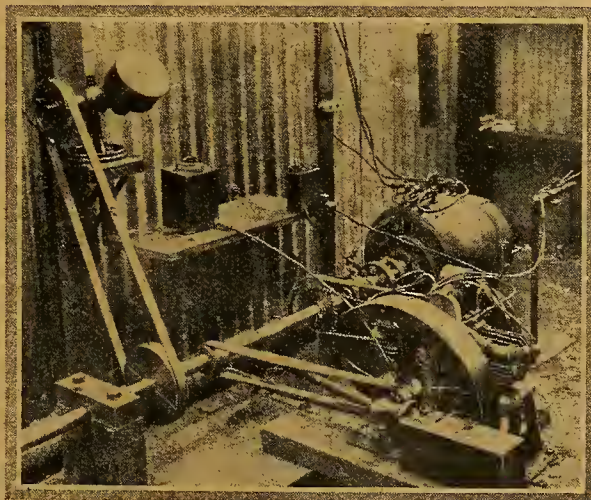
Overseas type are again sent overseas, the others being retained for home service.

**A Few Statistics.**

The motor cycle department was started in 1915, and has, of course, grown enormously since its inception. Here are a few figures: From January 8th, 1916, to July 1st, motor cycles repaired were 187; from May 5th, 1917, to November 3rd, the number of motor cycles repaired was 456, and though the work has greatly increased the cost per head has decreased very considerably. In fact, throughout the depot every effort is made to economise. Even the oily refuse collected after washing engines and gear boxes in paraffin is distilled; any paraffin recovered is used again, and the heavy residue is con-



Two of the officers enjoy a joke.



A Douglas engine undergoing an electrical power test.



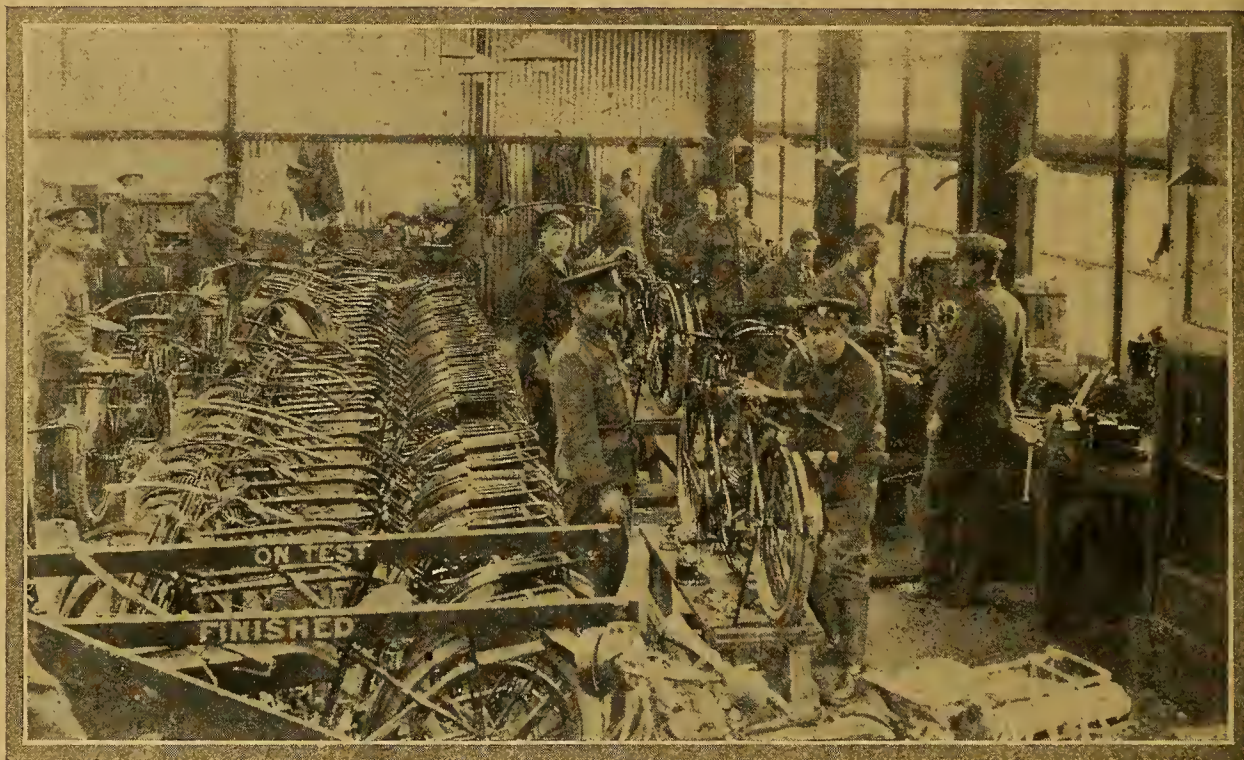
**In the Doctor's Hands.—**

sumed in the furnaces when the work of case-hardening is carried on.

Petrol is delivered from the railway to tank waggons, and is pumped from these by means of an electrically driven pump to 20,000 gallon tanks underground. The pump and motor are in separate iron huts, so that there is no danger of fire in case of accident with the motor. Altogether some 1,400 gallons of petrol are issued daily. These figures may make our enthusiastic motor cyclist readers' mouths water, but the petrol is used purely for army work, and there is no

joy-riding. In fact, the petrol difficulty hits these men very hard, as, though they live in an atmosphere of automobilism, and are many of them motorists of many years' standing, they cannot use their private machines for getting from this inaccessible place to the nearest main line railway station.

Our visit was a most enjoyable and interesting one, and served further to impress upon us the fact that the Technical Corps of our Army have reached a wonderful stage of efficiency which cannot but tell in this stupendous struggle against the forces of Central Europe.



Another view of the erecting shop.

## STORING A MACHINE.

**Precautions to be Taken when Laying Aside One's Mount for a Considerable Period.**

**M**ANY who have not already done so are now contemplating storing their machines for a sadly indefinite period, and judging from the numerous queries we have received relating to this matter, we take it that a few notes on the subject will be of assistance to our readers. If the thing is to be properly done, the best plan is to remove the tyres from the rims, hang up the outer covers, together with the belt, in a cool place, which is not too dry. Usually an attic or a basement affords the correct atmospheric conditions. The inner tubes are best lightly rolled and packed away in French chalk. It is a very good plan to insert a teaspoonful of water into each tube before laying it away. With regard to the outer covers and the belt, these may also be rubbed with a wet cloth at intervals.

In storing the machine dryness of atmosphere is exceedingly necessary. On no account should the machine be stored adjacent to a wash-house or any other outbuilding which is subjected to a steamy atmosphere. Moisture of this kind rapidly gets under the enamel, and when the machine has been stored a few months long strips of this can be scaled off simply with the pressure of one's thumb nail.

The best way to treat the plated parts is to concoct a solution of tallow dissolved in petrol, and apply this solution to all the plated parts with a brush, working it well into the nooks.

If no petrol is forthcoming the tallow may be heated and applied in the same way. This is far better than trying to rub on stiff vaseline, which cannot be worked properly into the corners.



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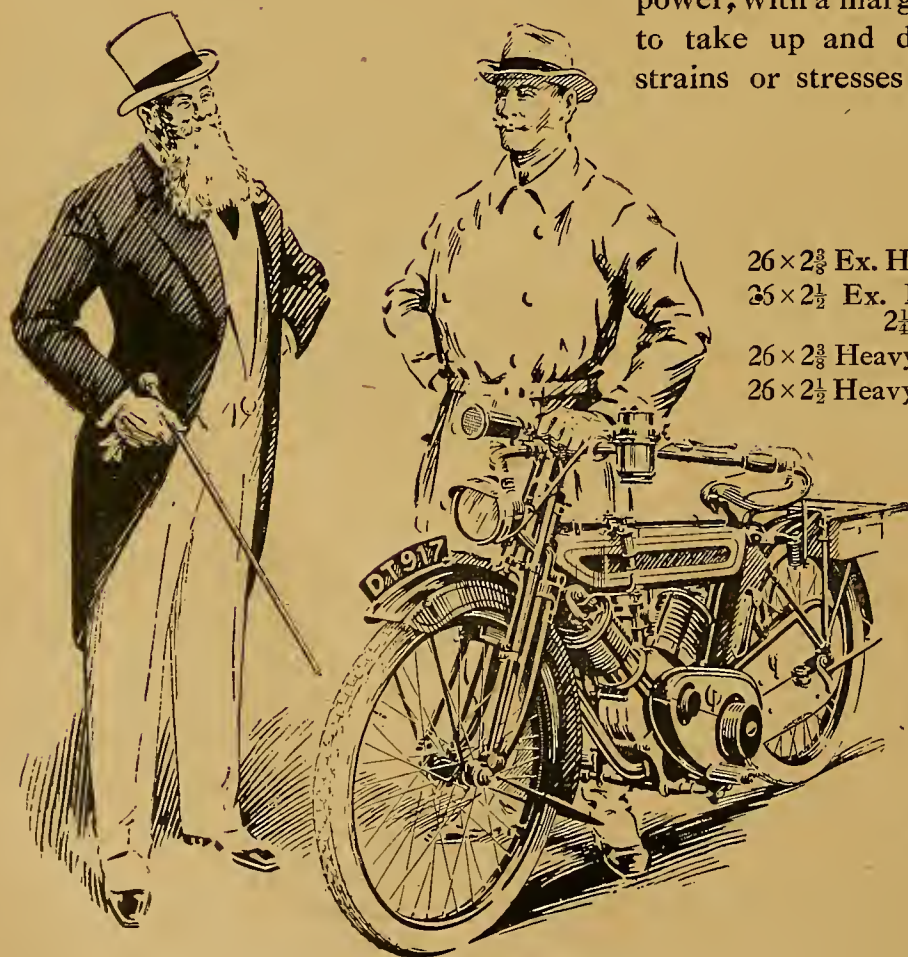
## THAT EXTRA BIT.

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you want that extra bit of speed up  
your sleeve *in case you need it.*

You've got it in that engine and—have  
you got it in your tyres? Are your  
tyres high-powered too? Can you rely  
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strain you put on them when you use  
that extra bit of speed?

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# FLYING

## FACTS AND THEORIES

### SOME POINTS ABOUT SCREWS.

By W. G. ASTON, A.M.I.A.E.



L'Automobile aux Armées.

TO those who, like myself, write articles there is nothing more gratifying than an attack in the correspondence columns by a reader. In the first place it gives us a chance to get in a second article which might otherwise be frozen out, and in the second place it clearly indicates that we have picked upon a subject which is bound to be full of interest, because it contains so many controversial points. One of life's bitterest disappointments, to me, was when I published some quite original results which had been the fruit of weeks of patient investigation and innumerable experiments. This was in *The Autocar*, and for many Fridays I turned to the "Letters to the Editor" section in search of the epistle that should denounce me as prevaricator. That letter never came.

This time, however, I am meeting with much better luck, for no sooner have I disposed of "O.J.F.S., Lt. R.F.C." (if I have disposed of him!), than up bobs one "H. Bullin." He joins issue with me upon the question of screw position, regarding which I had said that it was a fallacy to suppose that a "pusher" screw works more advantageously, since it engages with air to which the planes have already, by means of their skin friction, imparted a certain amount of forward motion.

Says he: "Once upon a time a certain naval constructor designed a hull, which, when undergoing its . . . tests, exceeded its designed speed by an appreciable amount, and on the reason being sought it was calculated that to attain this speed the propeller had to attain an efficiency of over 100%. Ridiculous! cried the engineering world concerned. (And well they might!) However, further investigation proved that the displacement caused by the hull in motion tended to set up a flow of water which opposed that of the slip-stream, with the result, which, I believe, has since become generally admitted to be correct, that an efficiency of over 100% was attained."

The observation in brackets is mine.

#### Perpetual Motion.

Mr. H. Bullin may, or may not, be right in saying that this 100% efficiency has been generally admitted to be correct. If so, I can only express my surprise—at the same time stoutly asserting that I, at any rate, admit no such thing. And for a very good reason, too. One hundred per cent. efficiency in any and every mechanical contrivance whatever is perpetual motion. Anything over the century is, of course,

even better than that. It reminds me of the famous "Poleforcia" prospectus, in which the promoters stated: "We do not pretend to have discovered perpetual motion—what we have got is something very much better!"

The "engineering world" in those days—it was the eighties, or my memory is at fault—had much to answer for, but there were times when it expressed itself very explicitly and accurately. This was one.

In any case, I would like to point out that this example of Mr. Bullin's is one of those classic fallacies that take a lot of killing, and I am, therefore, only too grateful to have an opportunity of giving it another crack on the head.

#### Determining the Pitch of a Propeller.

First of all, I want to know how this remarkable efficiency was calculated. Evidently by comparing the actual distance travelled with the theoretical distance which the ship should cover if the screw had no slip. How was this latter distance arrived at? By multiplying the pitch by the number of engine revolutions, obviously. But *how was the pitch arrived at?*

Equally obviously, by measuring the angle of the propeller blades with the plane of rotation.

Here we at once put our fingers on the weak spot, for the pitch of a screw working in a fluid medium is

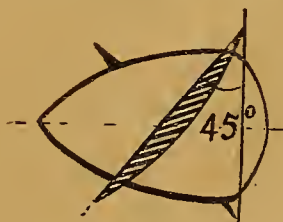


Fig. 1.

by no means so easily got at. Suppose we have a propeller as shown in the section (fig. 1). This has a blade angle of  $45^\circ$ , and therefore, neglecting slip, apparently a pitch equal to the circumference of the disc of rotation. But such pitch is purely apparent. It might conceiv-

ably happen to be the real pitch, but that would only be by chance.

If we take a plane with a section as shown in fig. 2, and move it through the air so that the chord, or lower surface, is parallel with the direction of travel, we shall find that such a plane has a distinctly positive lift, although it makes no angle at all with the plane of motion. Not only so, but if we move the plane in the opposite direction it will still have a lift.

One can make quite an amusing toy on these lines. Take a length of wood of the above section and mount it on a central pivot so as to be free to revolve. Then,



**Flying Facts and Theories.—**

if it is held in a brisk wind it will continue to revolve in the direction in which you give it an initial impulse. Apparently, it has no pitch, but really it has one.

**Negative Angle.**

It is obvious from this fact that real pitch is not dependent upon the "back" or "working surface" of a screw propeller, for as in the case of the aeroplane it is the "top" or "front" surface which does most of the work, and this factor must therefore be taken seriously into consideration.

If we repeat the experiment of the plane flying at no angle at all, and this time use a well-designed section, as in fig. 3, we shall find that we can set such a plane at quite a considerable *negative* angle to the horizontal CA, and it will still lift. Thus, as in fig. 3, the angle CAB is its apparent "pitch," and this is negative, whereas its real "pitch" is represented by the positive angle CAD.

The modern aeroplane's full speed is nearly always attained with the planes at an appreciably negative angle; in other words, the chord of the planes is pointing downwards towards the ground, yet the machine maintains its position horizontally. This, as



Fig. 2.

we shall see in subsequent articles on "stability," is a very important point. It is simply a case of the eye being deceptive, and what we have to do is to take such elements at their real value instead of assuming that this is the same as the apparent value.

**The Pitch of an Air Screw.**

Now, the discovery of this fact, *i.e.*, the positive lift of negatively inclined planes, was made subsequent to the screw propeller of "over 100% efficiency," and there is therefore some excuse for those answerable for its performance thinking that they had got hold of the ninth Wonder of the World. It is quite evident that had they realised that what they called the "working surface" of the screw was of far less importance than the other surface (for which they had

clearly chosen a highly efficient curvature) they could not possibly have miscalculated the pitch as they did. Even to-day, although we are well aware of reactions, of the existence of which they were excusably ignorant, there is no hard and fast formula for finding the true pitch of a screw working in a fluid medium. The best formulæ available do not pretend to be more than mere approximations based upon previous results in practice, and are consequently by no means infallible.

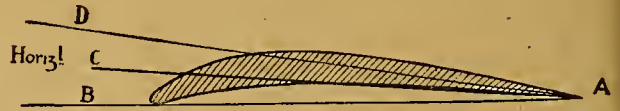


Fig. 3.

With regard to the second part of Mr. H. Bullin's letter, in which he says that the case of the screw, as cited above, is "exactly analogous to a slipping clutch of a car when ascending a hill," I regret I cannot see the slightest analogy whatsoever, nor am I at all clear as to what he means, therefore it is useless for me to attempt to argue with him.

**Eddy Currents.**

Finally, he says, "In the case of a 'pusher' type aeroplane, no streamlining can be so perfect but that some eddy currents . . . of the body are created. By placing the screw to take advantage of these currents some of the lost energy they represent can be reclaimed."

Considering that this energy is given to the air by the screw it is rather difficult to see what mechanical advantage is obtainable. Mr. Bullin is, it would seem, unaware that eddy currents are a most admirable means for dissipating energy, and that, as a consequence, it is desirable for the screw to work in undisturbed air, as it does in the case of the tractor aeroplane. In any case, his argument seems to be much as follows: When punting on a lake and towing another punt behind you will achieve some advantage by pushing the pole, not against the floor of the lake, but against the punt following you. This is an analogy of the case in point. The planes represent the first punt, the propeller represents the punt pole, and the eddy currents represent the punt that is being towed along.

## Munition Workers and Petrol.

SINCE August last unofficial measures have been in operation for the formation of a union of motor cycling munition workers, whereby representations could be made to the authorities with a view to securing the allocation of a sufficient quantity of petrol to permit of munition makers journeying to and from home and work.

An important meeting was recently held in Birmingham at which the pioneer work was ratified and the National Motor Cyclist Fuel Union constituted. There were nearly eighty delegates, representing various munition areas, and a membership of approximately two thousand was reported.

The Auto Cycle Union, which is giving active support to the Fuel Union, was represented by Mr. A. W. Torkington and Mr. T. W. Loughborough. Mr. Torkington was asked to take the chair, and

on doing so he addressed the delegates. He observed that it was the duty of the Union to look to the interest of motor cyclists whether they were members or not, and that in regard to the work of the Fuel Union the governing body would act as its mouth-piece in any dealings which were made with the Government. It was unanimously resolved:

"That this meeting of delegates from various munition areas hereby formally constitutes itself the National Motor Cyclist Fuel Union, formed for the purpose of obtaining special privileges in connection with the use of motor cycles by its members engaged in national work or the engineering and allied trades, and ratifies the steps that have been taken since last August towards the formation of such a Union.

"That the Union shall be controlled by a Council, which shall consist of members elected by the various local munition areas in the proportion of one councillor for every complete 100, or part of 100, members in any one area, with a maximum of four councillors for any one area."



# THE EARLY FRONT-DRIVE WERNER.

## A Schoolboy's Experiences on Road and Track.

**S**HE cost me thirty shillings, did my  $1\frac{1}{2}$  h.p. front-drive Werner, back in 1903, and I shall never be able to buy so much fun for the money again. A schoolboy is not over plentifully supplied with cash (or should not be), and the indulgent cycle-maker who let me have her accepted half-crown instalments, at irregular intervals. Even then she was a wondrous antique, but her tyres (French racing Dunlops) were thoroughly good, her frame strong enough for a modern twin, and her engine was a splendid job.

That was a proud moment when, after an overhaul lasting weeks (needless to say the price included the right to do all the necessary tinkering in the seller's workshop), we bore her down the steps. I had done my best to transform her into the outward semblance of a speed monster: the saddle had been removed, and a rickety luggage-carrier intended for a cycle substituted, liberally padded on top, the exhaust arrangements and pedalling gear scrapped, and in the place of the latter a piece of broomstick (wrapped with inner tube to conceal its domestic origin) did duty for footrests. (One had to mount gingerly.)

### My Very Own!

I sat astride her in the road, regarding the engine with affection and pride. Please remember that I was sixteen, she was my very own (for had not the first half-crown been paid?), and I had never been on a power-driven machine before. The kindly cycle-maker and his apprentices pushed lustily. We swayed down the road in wide arcs. She fired. Oh, irrecoverable moment! Never was such a bark as that baby engine possessed. They lodged complaints in the Maida Vale flats about me, because I would run up and down half the day wondering if it wasn't really possible to do something in the way of tuning on a surface carburetter.

Little Werner and I careered down the road, keeping an eye out for people who might know us, and be impressed. We rounded the first corner successfully, but on straightening up side-slipped on a tramline, and went down with a slam. (That was her first naughty trick, and her last: with the engine over the front wheel the little machine steered perfectly, and could be ridden "hands off.") I recovered my steed: a little acid spilt from the accumulator and some petrol (tenpence a gallon, so it didn't matter) was all that was lost, and we ran soberly round the houses back to where the expectant staff awaited us.

That was the beginning of a jolly time. A man named Arthur Cummings, who was very prominent as a speed exponent on the 70x70 class, used to haunt Paddington track near by. I showed him Werner. He was too well-mannered to laugh, and took

her and my efforts to make her do thirty miles an hour seriously. We bought a drill, and started to tune her.

### Tuning for Power.

The air intake to the engine was governed by a revolving sleeve on the handle-bar, and the neat mixture was led from a surface carburetter forward of the tank up the head column to the handle-bar lug, where the engine was bolted on. Drive was by twisted round belt (and some of you think a V belt is troublesome!) to a pulley on the front wheel, and you carried your oil in a little glass cup on the crank case. Coil and accumulator conspired together to defeat dull care: one or the other or both always needed attention. The band brake on the back wheel was splendidly efficient—until one day it broke; after that I remember I used to stop by dragging my feet on the ground and using the compression. (There is undeniably a special providence for mechanically-minded schoolboys.)

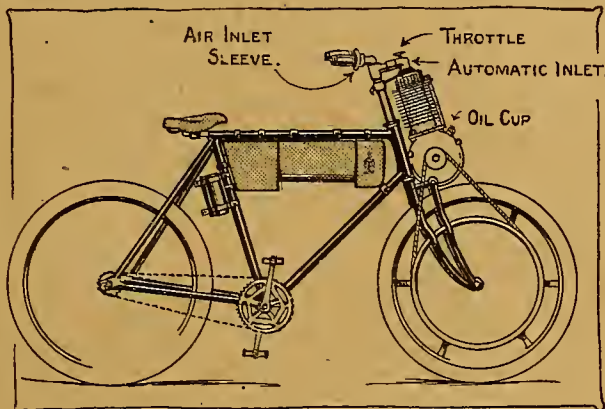
We removed the gauze from the induction pipe, and while this ran her consumption up terribly, it was worth it. I ran her to Brighton and back in days when none ventured on pedalless machines, and she took everything except the last stretch of Hand-cross. There her proud owner had to slip off and run; but she was forgiven, for it was a plucky climb for an engine aged and so small.

By this time we were regular *habitués* (sixpence admission) at Paddington track. One day we borrowed a back wheel from a racing push-cycle, with a fabric-sided tyre about the diameter of a lead pencil, and a slender wood rim and cobweb spokes. We inserted this in the back forks, gave Werner an extra swig of oil, and issued a formal challenge to a neighbouring youth who owned a wheezy 3 h.p. Kelecom. It was a Homeric struggle. I flattened myself along the top bar until I could flatten no more, sprayed with hot oil, and unutterably happy because the dreaded Kelecom was well behind. It was a famous victory, but as she crossed the line poor Werner seized.

Her piston had gone. We disembowelled a worn-out Yankee "Thomas" that we had access to. Some brisk work with a file, and the old rings, and the little engine was got going again—a thought metallic in the exhaust at speed, but serviceable. I always feared it was the drilling we did on that piston: we used much enthusiasm on the job, but little discretion.

Poor little 'bus. I suppose her rusty bones are lying in some forgotten corner. Still, I think in her time she gave a keener pleasure than my little opposed twin, now waiting in the shed, eager and twice as speedy, can ever give.

R.H.B.



One of the very earliest types of motor cycles.



# Current Chat

## TIMES TO LIGHT LAMPS.

### GREENWICH TIME.

Nov. 22nd	...	...	4.31 p.m.
" 24th	...	...	4.29 "
" 26th	...	...	4.27 "
" 28th	...	...	4.25 "

## National War Relief Funds.

At the week-end the principal war relief funds stood as follow:

The National Relief Fund (distributed £3,705,822)	..	£6,284,157	0	0
British Red Cross Fund	..	7,950,598	0	0
Tobacco Fund	..	140,125	0	0
King George Sailors' Fund	..	78,722	0	0

## Work of an Armoured Car Squadron.

Commenting on the work of the armoured cars, the *Daily Mail* says: "Wild and romantic have been the adventures of the men of the British armoured car squadrons who have just returned to London after fighting, under Commander Oliver Locker-Lampson, M.P., for over two years in Russia, Galicia, Persia, and Rumania. Some of them have been in the midst of desperate battles since early in 1915, when they were rushed over from Belgium and hurried to Russia with cars, stores, and ammunition.

## "Russian Welcome.

"They were banqueted and fêted in various Russian towns. Russian bands delighted them with the playing of 'Rule Britannia,' and the bitter struggles amid the pack-ice of Archangel were forgotten in the splendid heartiness of their greeting everywhere.

"Ever on the move, and establishing fresh bases wherever they went fighting; feasting, and sometimes starving, they at last reached the Galician front, to find themselves in the maelstrom of the great retreat.

## "An Army's Collapse.

"The collapse of the Russian front here," said one of the officers, "was a most sudden and astonishing thing. We were within two days of Lemberg, and expected to take it after a magnificent bombardment by the Russian artillery from 800 guns on a five-mile front. The collapse began with the capture of 20,000 Russians, who had taken a town but failed to hold it. They were surrounded and taken prisoners; panic spread, and a headlong retreat followed, the soldiers throwing away everything in their attempt to escape."

"It was in this emergency that the British cars showed their mettle. They splendidly covered the retreat, holding up great masses of the enemy, and astonishing friend and foe alike."

## Private Motoring Stopped in France.

Italy led the way in the matter of forbidding the use of privately owned motor vehicles for private purposes during the war. England came next, and now we learn that all French petrol licences for private cars have been withdrawn and that permits for petrol used for domestic and lighting purposes are to be cancelled on the 1st of next month.

## Motor Cycle Club Secretary in France.

Chatting with W. Cakebread, a veteran motor cyclist and founder of the Brookdale M.C.C., Catford, a correspondent learnt that the secretary, Alfred Hardstone, is an M.T. driver in France. H. A. Cooper, the temporary secretary, will be recalled as the conductor of the first Kent hill tours, "starring" on a single-gear Bradbury in the earliest attacks on Cudham and Hog Trough. Cooper, who occupies an important post in a South London military hospital, is occasionally seen on a lightweight Levis.

## An Old Trick.

A reader in Glasgow recently had a 3 h.p. two-stroke Omega for sale, and a soldier in the R.F.C. called with a view to purchasing it, had a look at it, and then asked for leave to try it. Our correspondent foolishly allowed him to do so, with the result that both machine and man disappeared. Fortunately, the police were able to trace the machine, and

## SPECIAL FEATURES.

### SPRINGING DEVICES.

### IN THE DOCTOR'S HANDS.

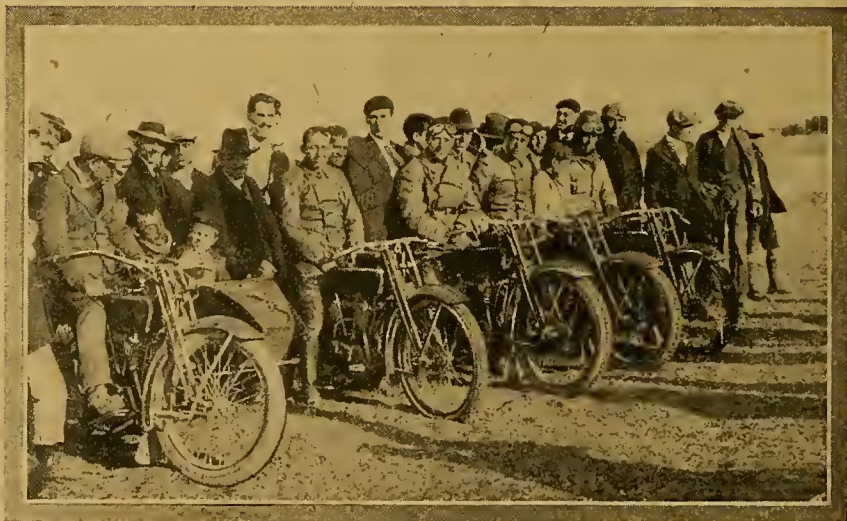
### SPARKING PLUGS.

succeeded in catching the thief, but not until he had victimised at least half a dozen other people. After being apprehended the culprit admitted the crime. He left the machine at a garage not very far from our correspondent's house, sold it to a garage proprietor the next day, who, in turn, resold it to another person.

## An R.F.C. Publication.

"The Work and Training of the R.F.C." 2s. 6d. (The Illustrated London News and Sketch, Ltd., 172, Strand, London, W.C.2.) The *Gazette* is published for and on behalf of the R.F.C., and contains an introduction most ably written by Lord Hugh Cecil, which gives a very fine idea of the work done by the Corps. The *Gazette* is beautifully and copiously illustrated, and covers every branch of R.F.C. activities. The picture at the base of page 30, showing a motor cyclist handing in a dark room trolley, will interest our readers.

Naturally, the primary work of the R.F.C. is with aeroplanes, but its transport service is extensive, and motor cycles are much used.



## SPANISH "T.T." RACES.

The winner of the sidecar race (Llivia) is shown on the extreme left, near to him being Cappel, who won the cup given for the solo class. Both rode Harley-Davidsons (see next page)



**The King of Spain's Cup.**

The annual race for the King of Spain's Cup, which is equivalent in Spain to our T.T. race, recently resulted in a sweeping victory for amateur riders. Harley-Davidson machines seem to have figured prominently, coming in first, second, fourth, fifth, and sixth, while in the sidecar class machines of the same make finished first, third, and sixth.

**Irish Petrol Restrictions.**

Notification appears in the *Gazette* that the Army Council has revoked the Order, dated December 7th, 1916, forbidding the sale of motor spirit in Ireland, except to persons holding a licence, signed by the competent military authority, permitting the purchase of the amount specified in the licence. The revocation will take effect as from November 9th. Further regulations providing for the sale or supply of motor spirit in Ireland have now been made by the Board of Trade.

**Petrol Wastage.**

We recently published a letter from a Cornish correspondent alleging that petrol was frequently being thrown into the sea by the coastguards of the Cornish coasts. Another correspondent, living in the Mersey district, sends us a cutting from a local newspaper from which it would seem that the throwing of the precious oil on troubled waters is a practice not altogether confined to the coastguards of the South-west.

**A Few Examples from the Mersey.**

In this district no motor vehicle may be taken on board ship until all its petrol is emptied, and, as no receptacle is provided, all the fuel finds its way to the turbulent waters of the busy estuary. Recently a motor launch was about to be swung aboard a battleship, but before this was done a nearly full tank of petrol was emptied into the sea. We are also assured that a ship on entering a repairing dock was forced to leave again and could not return for the repairs until some two hundred gallons of the precious spirit had been consigned to the lid of Davy Jones's locker. The master of the boat wanted to sell the petrol, but was told this was illegal, and consequently he had no alternative but to present it to the mermaids.

**A New Johannesburg-Durban Record.**

Dave Owen, of Johannesburg, Transvaal, South Africa, set up a new record between Johannesburg and Durban with his Powerplus Indian sidecar on October 10th. His time was 13h. 40m. The previous best time was made by an English sidecar outfit.

The Johannesburg-Durban record is a much-prized one, as it is over one of the most important courses in the Union of South Africa. Both solo and sidecar riders have gone out regularly during the past two years, and the time for the trip has been cut repeatedly in both classes. We are informed that Owen, who is connected with Williams, Hunt, and Co., Ltd., general representatives for South Africa for many makes exceeded the previous best sidecar time by an ample margin.

**A Confusion of Terms.**

The word "puncture" would probably not be understood in the States, where the technical name for such a misfortune is a "blowout"—a term which in this country usually refers to something of quite a different nature.

**Police and Silencers.**

The police in S.E. and Kent are actively enforcing the silencer regulations, although apparently overlooking cars and lorries, however noisy. It is not unlikely at the next batch of summonses against M.T. works depot motor cycle testers the local bench will be reminded of the fact that military motor cyclists on Service duties are using machines provided by the War Office, and that the riders themselves cannot really be held responsible for any petty law-breaking attributes of those.

**Petrol Position in America.**

The necessity of economising the petrol supplies has at last occurred to American motorists, and our contemporary, *Motor-cycle and Bicycling Illustrated*, recently devoted a leading article to this subject. It was urged that one good way in which to save petrol during the ordinary course of riding was to free wheel down all possible gradients, i.e., ride with the clutch disengaged, or with the gear in neutral.

**Which is it?**

An American firm advertises the fact that its *cylinders* (machined inside and out) are "quite round." This is evidently a new type of "cylinder," somewhat resembling a tennis ball, though even then we fail to understand how, if it is a cylinder, it can be round, while obviously if it is not round, and really cylindrical, why talk about it?

**A Lemon as a Carburetter Bowl.**

A correspondent in an American contemporary explains how, having fallen off and utterly smashed his carburetter float chamber, he managed to get home on a scooped-out lemon functioning in place of the float chamber! Has anyone tried a banana as a sparking plug?

**British Imports and Exports.****IMPORTS.**

For the month of October there was a slight increase over the previous month, the value being £3,156.

**EXPORTS.**

The extraordinary increase in the export of motor cycles and parts has been commented upon in a leaderette. It will be seen that compared with the figures for October, 1916, there is a very large increase, and a still larger against the 1915 amount.

**OCTOBER EXPORTS.**

	1915	1916	1917
Number of motor cycles	880	1,497	3,011
Value of motor cycle, parts, tyres, accessories	£64,352	£105,410	£268,269

**PETROL IMPORTS.**

There was a big increase in the importation of petroleum, the heading under which all oils come. In September we imported 84,814,203 gallons, and in October 123,005,420 gallons. The October petrol figures, which are included in the above, constitute a record for the year.

	1915	1916	1917
	15,982,832	16,399,255	13,887,674

The number of gallons imported during the preceding nine months:

January .. .. .	13,001,740
February .. .. .	12,257,984
March .. .. .	9,246,546
April .. .. .	10,258,951
May .. .. .	12,270,934
June .. .. .	11,327,434
July .. .. .	12,346,846
August .. .. .	7,853,368
September .. .. .	13,278,972
October .. .. .	13,887,674

**A FULL COMPLEMENT.**

An East London (South Africa) motor cyclist, Mr. Van Den Berg, of the Police Department. He does not believe in taking his pleasure singly, as will be gathered from the photograph. The dicky seat on the back fits over the chassis of the sidecar, and takes only a couple of minutes to fix.

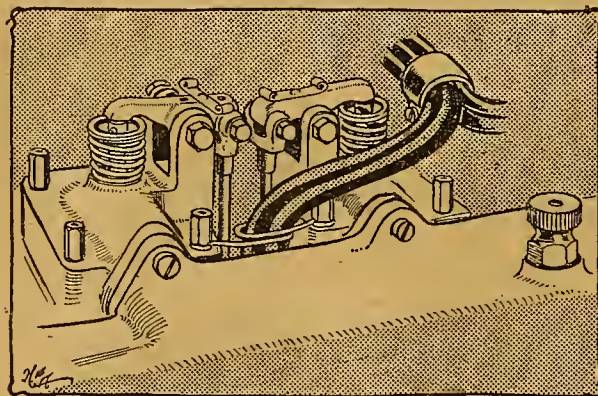


# THE HENDERSON FOUR-CYLINDER.

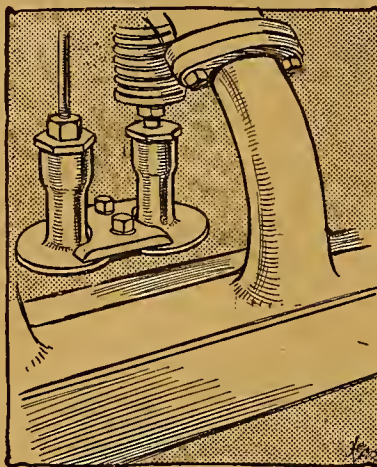
## Some Further Notes on the New Engine.

IN the last issue of *The Motor Cycle* we gave a description of the 1918 model four-cylinder Henderson. These particulars were given to us by our American correspondent, but since their receipt we have been able to see one of the actual engines, which is now in the hands of the English agents for this machine, Messrs. Robertsons, Ltd., 157b, Great Portland Street, London, W.1. Naturally, Messrs. Robertsons are unable to supply the public with this engine, and it has been merely despatched to them for the purpose of replacing one which has been running since 1915 in their sidecar trolley.

Thanks to Mr. Robertson Brown's kindness, we are able to show a few illustrations of the engine details, which constitute considerable improvements over last year's model. The overhead inlet valve gear has been considerably modified in design, and is now quite silent. The tappet rods, instead of having ball socket ends, are now provided with yoke ends, and both the yoke pins and rocker bearings are supplied with adequate provision for lubrication. The sketch shows the holes immediately over the bearings, which are covered by means of a spring clip. The holes are tapered so that, while there is plenty of room for the insertion of the nozzle of an oilcan, the bearing surface has not been interrupted or reduced by too large a hole leading to the journal.



The overhead valve gear, showing the rocker lubricators, the new yoke ends to the tappet rods, the power unit support, and the priming cock in the inlet manifold.



The method employed of holding down the inlet exhaust tappet guides.

### Petrol Injection.

It may be noticed that the high-tension wires are led through a neat clip so as to save them from chafing through vibration. The sketch also shows a portion of the inlet manifold, and in the centre is a small priming cock; there

are no compression taps in the cylinders. This is distinctly an advantage, as the petrol injected here reaches the cylinders *via* the inlet valves.

### Tappet Guide Fitting.

Our next illustration shows the manner in which the inlet and exhaust tappet guides are held in the crank case. Formerly they were screwed in, but the present arrangement is much more satisfactory and follows standard car practice.

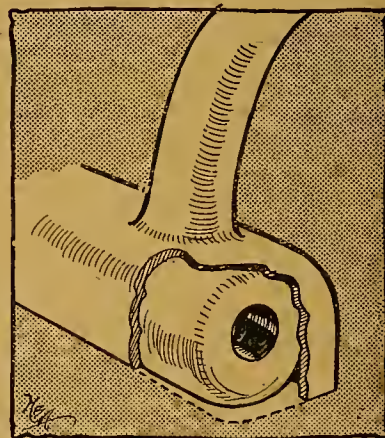
Reference was also made in our previous article to the introduction of hot air to the engine, and our third

illustration shows the manner in which the air is taken from the bottom of the exhaust pipe, the actual intake being in such a position as to be shielded from mud and dust. Pure hot air, and not exhaust gas, is drawn into the carburetter.

### A Light Machine for its Power.

In our description we suggested that the magneto might become overheated when the engine was running and the machine stationary owing to its proximity to the cylinder, but this has not been found to be the case, as there is plenty of clearance between the magneto and the radiating fins. We have ridden an earlier model Henderson for a good many miles and have never suffered from this trouble on the road. It may be mentioned also that the magneto has been in this position on the Henderson since 1912.

Other interesting points regarding this extremely up-to-date machine are the fact that it is 25 lb. lighter than any other American motor cycle fitted with an engine of the same cubic capacity; sidecar lugs now form part of the frame, and all threads employed are made to S.A.E. standard, so that nuts and bolts can be procured anywhere. While plated parts have been eliminated so far as possible, this style of finish has been retained in the case of the inlet manifold, the carburetter, and the chain wheel, the general effect being excellent.



The warm air intake, showing how the end is protected from mud and dust.

## STOVE ENAMELLING FOR AMATEURS.

SOME time ago we went to see a friend who was fortunate enough to have a perfect treasure of a valet. Not only was he exceedingly expert at looking after his master's needs, but he was an enthusiastic and clever motor cyclist. His cleverness lay chiefly in his ability to spot bargains and to renovate them, and afterwards to sell them for a good price. He was an expert tuner, and remarkably good at restoring lamps and other accessories. It occurred to him one day to try the effect of stoving on an old lamp which looked rather the

worse for wear, so he painted it over carefully with Robbialac, and placed it in the kitchen oven. The correct temperature was guessed at, but, fortunately, hit off accurately, and the result was a most excellent finish of hard enamel.

We recently communicated this fact to the makers of Robbialac, and they inform us that, while Robbialac is an air-drying enamel, giving a result equal to stove enamelling, it may be an experiment of great interest to amateurs to attempt to stove an article painted with it, especially in the case of small acces-

sories, such as lamps, carriers, generators, etc., needing to be quite hard and to be done in the shortest possible time. Where dark colours are used the temperature should not exceed 200° Fabr. and the time six hours, while for light shades the temperature should not be more than 150° Fabr. and the time from eight to ten hours. The figures given are approximate, and amateurs may find it necessary to vary them slightly in accordance with their experience. The temperature, of course, must be read on a special high registering thermometer.





## Sparking Plug Design.



### SOME NOTES ON IMPROVING PRESENT DESIGN.

EVERY competition rider, whether his department be speed work or reliability, and, indeed, every humble tourist, is conscious of the fact that there is very much room for improvement in sparking plug design.

In plug design we are up against two great weaknesses, to eliminate either one of which is a comparatively simple matter, though to eliminate both simultaneously appears to present great difficulties. On this page I set forth a design which aims at overcoming these weaknesses, while, in addition, it gives a plug of sensible dimensions which can easily be taken to pieces for cleaning purposes, etc., the gastight joints being small, while the means of bringing pressure to bear on them is adequate. The weaknesses this design aims at overcoming are oiling up and overheating of the central electrode.

#### Present Designs.

There are several plugs on the market that show no tendency towards overheating, and the Lodge racing plug and the Reliance racing plug can be taken as two types which attain this end by entirely different means. In the Lodge overheating is prevented by means of a substantial central electrode and ample provision made for conducting the heat to a radiator at the top of the stem. In the Reliance overheating does not occur owing to the central point being extremely fine and embedded in the insulating material, so that it is exposed to very little of the heat of the explosion, while what little heat it does pick up is instantly absorbed by the body of the electrode.

Thus we have two different systems, both of which are more or less effective in their own way, but in neither of them are the two weaknesses referred to simultaneously overcome.

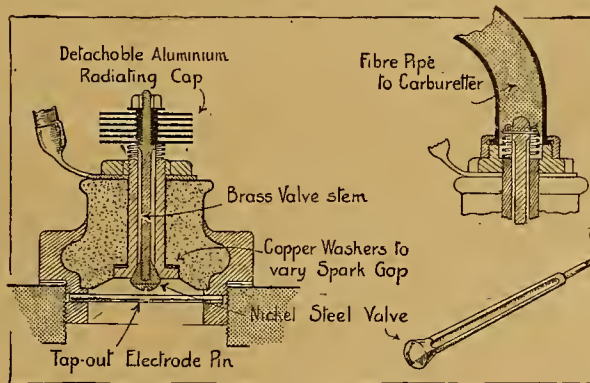
As regards oiling up, the type of plug which would be least susceptible to this defect would be one having extremely fine wire points protruding well into the cylinder, but it is an established fact that in modern highly efficient engines this class of plug causes pre-ignition.

#### A Suggested Design.

A design suggested is clearly shown in the drawing on this page. The central stem of the plug may be likened to an automatic inlet valve, free to reciprocate in the sleeve carrying it. To this sleeve is attached the high-tension wire, and it will be seen that the electrode stem is grooved so as to admit the passage of air or gas. Thus, on the suction stroke of the engine this central stem leaves its seating, and cold air is drawn along its entire length, tending to cool it. At this juncture the central sparking points are in contact, thereby scattering oil and carbon and keeping the sparking surfaces perfectly clean. Immediately compression begins the stem comes back to its seating, being assisted in doing so by a light coil spring at its cool extremity. Thus the principle suggests a means of evolving a plug which is not only oilproof, but which is efficiently cooled, and it will be noted that the width of the gap is adjusted by means of thin, coned, copper washers between the core of the plug and the insulating material.

#### Localising the Mixture.

This design offers a further development. It will be observed that it consists of a small automatic inlet valve, which normally draws in a minute quantity of air at every suction stroke, but suppose that, instead of allowing it to draw in air, we permit it to draw in a mixture from the carburettor slightly richer than that fed to the engine by the inlet valve. This could be arranged by means of a short pipe connection straight to the carburettor, drawing its supply, say, from the pilot jet.



Two suggested designs of air-cooled plugs which aim at eliminating oiling and sooting up troubles. These plugs are easily taken apart, while the spark gap is adjustable.

The gas passing the central electrode would be of extremely low temperature, and would thus tend to keep the electrode cool. This is not the only point to be considered, for by this means we could feed direct to the sparking plug

a small quantity of gas which would explode under practically any conditions. Even if the charge in the cylinder were too weak to be fired in the ordinary way, I am of the opinion that explosion would occur if the mixture in the exact vicinity of the sparking plugs were correct, and an explosion starting at this point would complete the ignition in the whole of the combustion space.

#### Pocketing the Plugs.

It may be argued that there is very little in this theory, and that in some engines the plugs are considerably pocketed, yet good results are obtained. My reply is that, though the loss caused by pocketing the plug is so slight as not to be noticeable in an ordinary touring engine, it is easily discernible when it comes to tuning a racing engine for speed. Ordinarily the plug may be pocketed in a four-stroke engine, where the scavenging is more or less complete, but the fact that such liberties cannot be taken with two-strokes and racing engines goes to prove that loss inevitably occurs.

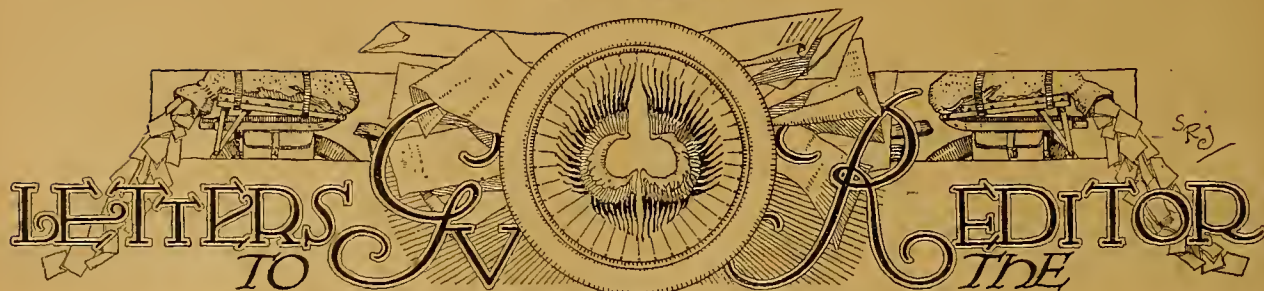
#### Economy and Ease of Starting.

It is reasonable to suppose, then, that if the charge in the exact vicinity of the sparking points were correct, much improved results would be obtained when it came to running on a very small throttle opening or on a very weak mixture, while ease in starting would be assured. Therefore a plug of the design suggested would not only run cool and be immune from oil, but would also permit of greater economy. The connection from the centre of the plug to the carburettor, of course, would have to be of some non-conducting material, such as fibre, and the construction of such a connection should be a fairly simple matter.

I have not tried this design in practice, but, while not expecting it to revolutionise the running of a normal engine, I do think it suggests material advantages, especially for use in highly efficient or very oily engines. Another of the aims of this design is to do away with the necessity of flooding the carburettor at starting.

CHINOOK.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### MOTOR CYCLE AMBULANCE FOR RED CROSS WORK.

Sir,—In last week's issue of your interesting paper, you published particulars of a motor cycle ambulance. This has given rise to the thought that a similar outfit might be given to the Red Cross by the motor cyclists of Birmingham and district.

We will undertake to do all the work connected with the scheme, and carry the whole thing through entirely free of expense, and we are getting in touch with the Red Cross to find out if the gift would be acceptable. We presume that no difficulty would be placed in our way of securing a Class A certificate. We propose to purchase an outfit of local make entirely, and at the lowest cost. It is suggested that the outfit should be given for work to be done in Birmingham, but it would be placed at the disposal of the Red Cross without any restrictions whatever. We hope that motorists interested will write to us, telling us what they are willing to give, or if they will assist in any way, but not to forward contributions until asked for through the medium of *The Motor Cycle*.

Communications should be sent to the Easting Windscreen Co., 79, Colmore Row, Birmingham. We hope to be able to report considerable progress next week.

THE EASTING WINDSCREEN CO.

#### A SPORTING CHALLENGE.

Sir,—As a rider of a W.D. Triumph since it was first manufactured, the statement by "M.B., Ch.B.," that he has yet to find the W.D. Triumph that will stand a prolonged fast run solo without breaking an exhaust valve or drying up very much interests me.

Reading his letter over several times, I have come to the conclusion that he is talking about a machine he has never ridden.

Having tried most of the first-class makes, English and American, during the past sixteen years, I have come to the conclusion that the W.D. Triumphs are amongst the most reliable yet produced, and one of the few makes that can stand fast runs without any detriment and drying up; while when it comes to rough going in sand, in mud, or across fields, they are simply "it."

The usual disclaimer.

DESPATCH RIDER.

Aldershot.

Sir,—I read with much astonishment a portion of "M.B., Ch.B.'s" letter in your issue of the 15th November, wherein he states "I have yet to find the W.D. Triumph that will stand a prolonged fast run solo without breaking an exhaust valve or drying up," and can only assume that his riding experiences with this type of machine have been either very limited or very unfortunate.

As an N.C.O. in charge of a section of these machines for nearly two years, with a personal record of 12,000 miles ridden on them during this period, my experience has been exactly opposite. Our valve breakages were practically nil; and as for drying up at speed, well, his experience is not mine, and I think he will agree that D.R.'s have every opportunity, and take it, of testing their machines in this way. Probably good tuning, intelligent driving, and overhauling at the proper time have their due reward.

I have ridden nearly every popular make of machine, both in and out of the Army, and have nothing but praise for the W.D. Triumph. Its wearing and running qualities are tip-top, its appearance is smart, and no mechanic will grumble when it comes to a question of accessibility or ease of removal of any part for overhaul or repair.

In spite of the two serious faults which "M.B., Ch.B." attributes to this make of machine, I have yet to meet the Army D.R. who would be disappointed over the issue of a Triumph to himself, to say nothing of the appreciation of those who are lucky enough to be already riding this machine on war service.

I hope your correspondent's champion single will justify his expectations. If it whacks the Triumph I should be happy to be the proud possessor of it.

D.R.C.

Cardiff.

#### THE SINGLE V. THE FLAT TWIN.

Sir,—Though I have read *The Motor Cycle* for many years without "rushing into print," I feel that I cannot pass without response the letter from "E.W.R.P.," in which he states "that it is no more trouble to look after the twin than the single" in France.

As a divisional D.R., I found that when we were in rest the smaller machine stood up to the work if care were exercised, but as soon as the division was in action a very different state of affairs was experienced. Broken frames, forks, and particularly steering columns were so common that our work was seriously impeded, and the Signal Service did not recover until we were given Triumphs. We then no longer had the trouble of constantly replacing flimsy fittings, which persisted in rattling off, and on all points I can cordially endorse the letters of "Two Lieutenants."

The lightweight in question is an excellent machine in its way, but its proper sphere is certainly not near the front line.

Lincoln.

DE H4.

#### EXHAUST POPPET VALVE DESIGN.

Sir,—I do not know whether it has struck many people that the only reason that a valve will stand at all is because there is no air (oxygen) to burn it. A valve (exhaust) is working at red heat all the time during load, especially in an air-cooled engine, and, as everyone knows, red-hot steel rapidly scales or oxidises in the open air. Therefore why allow air to come in contact at all? Cool inert gas, such as exhaust gases, is a different matter altogether, and this is where some good might be done. One great point must be borne in mind in designing valves, and that is weight. [We have no doubt that many of the points suggested above by our correspondent will meet with criticism.—Ed.]

I have had considerable experience with the De Lissa type of valve, and find that unless the cams are very carefully designed, at high speeds the valves have a tendency to lag; that is, the spring is insufficiently strong to overcome the inertia of the valve at full lift and at high speed. Consequently popping occurs, and in order to cure this the valve spring load has to be considerably increased, thereby setting up loads in the rocker arms, which ultimately lead to breakage. I have broken several in this way. The principle is right, as the red-hot part of the valve does not come into contact with cold air, but conducts its heat to the top part, which never gets hot enough to oxidise. Also the spring load is transferred to the top of the head instead of stressing the stem. In order to get this valve down in weight, the conductivity of the valve head is reduced owing to its thickness becoming reduced, so that the only remaining good feature is the overhead spring. And this is not sufficient to balance the orthodox type made very light in a tungsten or other alloy steel.

OLIVOS.

Acton, W.



## THE NEW PETROL REGULATIONS.

Sir,—I have read with interest your readers' letters on the above subject in the November 8th issue, and I also put in a plea for consideration. My case is as follows:

I am in the Army stationed in the North. My home is twenty-five miles away (the limit we are allowed to travel). Being in khaki we cannot go by rail, and, under doctor's advice, I had to give up "push" cycling. The only means I have of seeing my wife and family is by motor cycle when off duty at week ends (owing to medical category I am in the A.P.C.). I ride a 2½ h.p. two-stroke, and a two-gallon tin of petrol or substitute would last me a month. My application for renewal of licence was refused. Consequently I have to stay here.

Surely seeing your family cannot quite be classed as "joy-riding"? as many a soldier has little matters of business to attend to when convenient. If men who are on work of national importance can use motor cycles, why not the soldier? Isn't he doing work of national importance? My case is only typical of scores. When we were able to use the motor cycle it was the only bit of recreation we had, and now that is taken away from us.

U 2784.

## PUSHER OR TRACTOR.

Sir,—May I reply to H. Bullin's letter in *The Motor Cycle* of November 8th? As far as I can see, he tries to point out that the speed divided by the pitch multiplied by the revs. of a screw can be greater than unity. This would be a case of negative slip. Ridiculous! There is no such thing as negative slip. A screw works in the wake stream of the vessel, and this stream has a forward motion in the same direction as the vessel.

$$\text{Apparent slip \%} = \frac{\text{Speed of screw} - \text{Speed of vessel}}{\text{Speed of screw}} \times 100$$

All in the same units.

Take a case:

Speed of screw = 10 knots per hour.

Speed of vessel = 8 " "

$$\text{Apparent slip \%} = \frac{10 - 8}{10} \times 100 = \frac{2}{10} \times 100 = 20\%$$

Now actual slip %

$$= \frac{\text{Speed of screw} - (\text{Speed of vessel} - \text{Speed of wake})}{\text{Speed of screw}} \times 100$$

All in the same units.

Let us take speed minus speed of wake. A wake factor of .35 V means that the wake, or following stream has a speed of .35 of the speed of advance. Therefore the true speed of vessel is  $10 - 3.5 = 6.5$  knots in relation to speed of propelling plane.

$$\text{Actual slip \%} = \frac{10 - 6.5}{10} \times 100 = \frac{3.5}{10} \times 100 = 35\%$$

The naval constructor would know the speed of the wake, or an approximation near to it, before he tried out his design, and there would be no need of an investigation to find out this after the trial, as Mr. Bullin suggests, because the speed of the wake plays an important part in hull and propeller design. I may mention, for Mr. Bullin's information, that the speed of the boat minus the speed of the wake is probably the chief factor in propeller design, and is always known before getting out the diameter or pitch.

There is little or no advantage when a screw works in a wake stream, either air or water, and Mr. Aston's statement is correct.

The points I take objection to in Mr. Bullin's letter are:

He confuses the ratio  $\frac{\text{Speed of vessel}}{\text{Speed of screw}}$  with efficiency—a totally different thing.

The efficiency % of a screw is

$$\frac{\text{The H.P. given out as thrust}}{\text{The H.P. supplied to propeller}} \times 100$$

Generally about 50-60%.

His statement about the investigation after the trial is a trifle too large. As you will probably know, most of the information about a new form of ship is got from towing models of that ship. When a screw works in a wake stream, increase of thrust is got at the expense of exerting suction on the after body of the vessel, giving a greater resistance to the forward motion of the vessel, and this leads up to

a statement that the wake "gain" is nearly balanced by the "thrust deduction."

This subject is too complex for a letter, but I think the above can be easily followed. V<sup>3</sup>.

Newcastle-on-Tyne.

## SPRING FRAMES.

Sir,—It is some considerable time since I noticed any reference to spring frames in *The Motor Cycle*. Surely this is a subject which deserves more attention than controversy on flat and V twins. An engine is not of much use without a frame, and no matter how carefully an engine and connections (especially a combination) are cared for, it is lamentable to observe the extent of wear and tear due solely to road shocks. The majority of English riders have no conception of what a typical road in Donegal or Fermanagh means—a mere cart track usually, and strewn with loose stones and protruding boulders. Of course, the main roads are sometimes quite passable, but when one gets off the beaten track it is an agony to keep up any sort of a decent average.

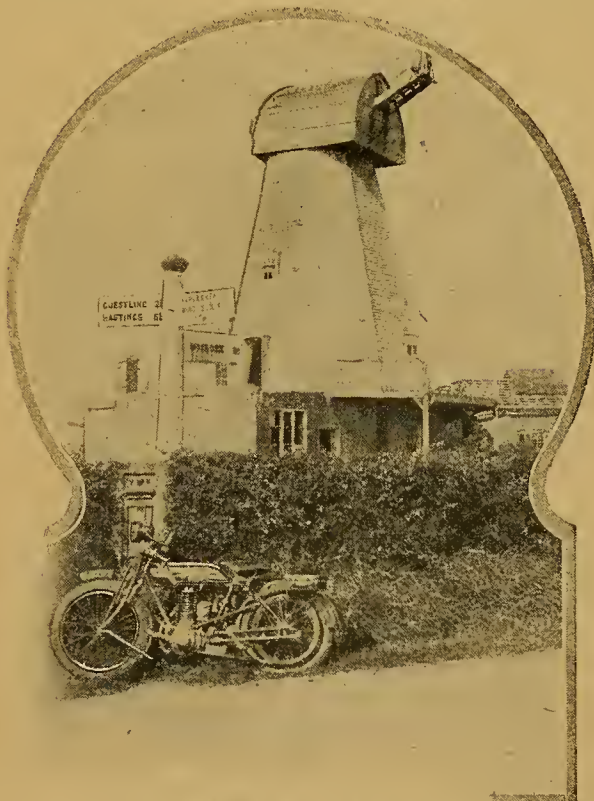
During the past nine months I have had to replace my back axle twice and front once, and usually a few spokes are to be seen entwined round their neighbours. I can attribute this to no other cause than the solid resistance with which a "bump" is met, and lack of means for absorbing at least part of it.

Before our manufacturers dabble with powerplus engines and aluminium pistons, I think it behoves them to design a suitable frame to contain their production, or the advantages to be obtained from better engine design will not be fully appreciated or experienced.

I am a constant reader of your valuable paper, which contains many items of interest and education.

MAX LESTRANGE.

[This question has not been forgotten—see pages 488-9.—Ed.]



## DISAPPEARING LANDMARKS.

Many of these old picturesque windmills are fast falling into decay, but the towers of a few are still to be found, in which either a steam or a gas plant has been installed, and the work of milling continued in spite of the competition of the big flour mills. The tower shown is on the Hastings and Rye road, and the motor cycle a three-speed Rover



### ICE ON THE JET.

Sir,—I have frequently noticed your correspondents complaining about a peculiar pulling up of their machines after running a mile or so, the machines gradually stopping, but starting again quite easily after a minute's rest.

I have never yet seen the following valid explanation given: Under certain weather conditions the moisture in the atmosphere condenses on the jet, giving it a cap of ice, and effectively preventing any further flow of petrol. This cures itself temporarily as soon as the engine stops by allowing the metal of the carburettor to conduct the heat of the carburettor as far as the jet. I have frequently cured this trouble in a two-stroke by fully retarding the spark, when (in some makes) the gas will become ignited in the crank case and induction pipe, thus melting this capping of frost on the jet. Of course, a hot air intake is a permanent cure.

Solihull.

LIEUT. R.F.C.

### ACETYLENE AS A MOTOR FUEL.

Sir,—I read with much interest the article of Mr. Howard on acetylene as a motor fuel in your October 4th number. I have often thought of the same thing myself, and made a few investigations. The following table may be interesting to some of your readers:

	Petrol.	Acetylene.	Coal Gas.
Percentage of gas in mixture ....	2.63 4.76	5.0 14.0	7.0 17.0
Rate of explosion in secs. ....	.059 .066	.085 .034	.28 .050
Pressure exerted at explosion in lb.	86 56	54 112	52 96

The percentages in each case are the maximum and minimum at which the experiments were carried out.

It will be seen that a mixture of 5% acetylene gives similar results to a mixture of 4.76% petrol vapour, but when an excess to the extent of 14% is used the pressure exerted at explosion is terrific (just double), and explains why the cylinder heads blow off!

If one used a mixture of petrol vapour as rich as 14%, the pressure would be less instead of greater.

It is quite evident that if the mixture can be kept weak enough (in the case of acetylene), it would make quite a good fuel.

Unfortunately, in the tests made of which I have heard, the acetylene has been taken straight from a generator, and consequently under pressure, which means that as soon as the throttle is opened the gas is forced in, instead of being allowed to be drawn in, by the suction of the piston.

I think that, if the acetylene were contained in a bag the same as coal gas, and a very fine jet used, and also a larger air inlet, it would give satisfactory results.

Of course, as Mr. Howard points out, it is hardly likely to be of much practical use on account of the cost of carbide, but for anyone who, like myself, likes experimenting for the pleasure of it, it would be interesting to try it.

Saltburn.

CHEMIST.

### AN APPEAL TO THE ENGLISH MANUFACTURERS.

Sir,—I have noticed during the past year or so, and particularly in recent issues, a good deal of correspondence directed against the American productions by certain of your regular subscribers. I am afraid there is an increasing tendency in certain quarters to decry all things American, merely because they do not conform to our ideas, and perhaps because in other branches of engineering we have been more than able to hold our own.

Now that the American Army is bringing over 7 h.p. twins as the standard mount, we shall have an excellent opportunity of studying them under conditions that have been almost too much for our singles. No one will accuse the British single of being inferior to the American single, but our big twins compare most unfavourably with the prevailing models from the other side.

As regards the engine, I will go so far as to say that after a varied experience of practically every English and American big twin, including several makes not marketed over here, I have yet to find an English engine that will compare at all favourably with the American, particularly for quietness and flexibility.

There are two enormous selling points of the future. Compare, say, a certain 8 h.p. engine—an excellent example of sound British construction, that has given me wonderful

service in the past—with a 7.9 h.p. Harley or Excelsior. The American engine is lighter, more flexible, and, although of greater b.h.p., is infinitely quieter and more tractable than the British, to say nothing of its superior mechanical lubrication. Were that power unit put into a frame that conformed more to our ideas it would sell even more readily over here; and the American manufacturer, realising this, is sufficiently wideawake to produce special models for our market.

The American manufacturer already appreciates the fact that his big twin is not the only desirable type: this is obvious by the way he is producing other models, the Paramount and the two-stroke Excelsior in particular—the latter an absolute Baby Triumph, selling at \$140.00. When he sends over a 500 c.c. mount—whether it be a flat twin, V twin, or single—that is as tractable and silent as his big twin, he will become a much more serious competitor.

After the war—say, 1919—I suppose we shall put a few machines on the market with spring frames and mechanical lubrication. About time, is it not, considering that Hendees have marketed the former since 1913 and the latter since about 1910?

Like "D.R." of "The Critics," I am a "one-stripe" despatch rider, and have had yeoman service from the two standard singles that we use out here, but—and it is a very big but—they both leave much to be desired. Were I given my choice I would plump for a Yankee twin, with its big clearance, 3 in. tyres, and its ability to plug along under almost any conditions. One would imagine from the continued harping upon their weight and unwieldiness that some riders spent half their time man-handling their machines! Personally, when at home, I do not keep my machine in the area or at the top of a stack of flats, so that a little extra weight does not worry me much! Incidentally, have some of these writers compared the weight of a 7.9 h.p. three-speed rigid Indian with that of a 4 h.p. Triumph, both machines fully equipped? There is little difference.

It is not that our manufacturers cannot produce a better thing than their present type—after all, they have made the motor cycle a commercial proposition—it is because they are content to carry on until decreasing sales force their hand.

Remember this, Mr. Manufacturer, it is easier to keep the American out than it is to beat him when he is firmly established over here. I wonder how much the Hendee and Harley-Davidson people have taken out of your pockets since they have been on our market? One or two smaller firms have risen to the occasion—notably the A.B.C.—but when are the six big makers who represent the English trade going to put out a real live effort? The time is almost ripe—at the most you have but another twelve months. Do not miss this opportunity, it may never occur again!

B.E.F.

V. N. LAVENDER.

### AVERAGE SPEED.

Sir,—In the letter headed "Average Speed" of your issue dated 8th November, Lt.-Sgt. A. H. Jenkins, R.F.C., supports "E.K.'s" statement that "E.K." can do 75 m.p.h. on a standard Sunbeam single.

I have had considerable experience of speed irons, both at Brooklands and in France before the war, and have no hesitation in saying that the only bicycle which I have ever known to approach this speed is the Norton, and even then one had to have ideal conditions, with a stripped machine, to get 70 m.p.h. I have worked for weeks to get an engine up to 65 m.p.h., and would very much like to see "E.K." take his chance over the kilometre against Mr. Ebbelthwaite's ruthless watch. I am afraid the time would be very disappointing. I had a case of "speed" the other day similar to "E.K.'s," when an officer (now in France) showed me the certified times taken over the half-mile by friends of his with stop watches. He was riding a standard W.D. Triumph, geared 5 to 1 on top, and the speed worked out at about 76 m.p.h. Fancy a 5 to 1 gear for Brooklands, and imagine the revs. of that Triumph! I am afraid that amateur time-takers "count their speeds before they are hatched."

In conclusion, I may say that the fastest standard Sunbeam which I have ridden touched 52 m.p.h.

My wife (née Miss Minnie Tully) fully endorses these views of speed, and knows how difficult they are to obtain, although she rides a big American twin.

JOHN G. GRENFELL.



# QUESTIONS AND REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## Irregular Firing.

**?** I have a Clyno two-stroke which I can only get to fire intermittently (four explosions and four misses). The engine is clean and all joints are tight. It is fitted with a C.A.V. magneto, which is clean and free from oil.—J.M.

We should recommend you to experiment with a slightly smaller jet. This may cure the trouble. If, however, after trying one or two jets of different sizes, the running of the machine does not improve, we should recommend you to have the magneto examined by an expert.

## Over-lubrication.

**?** I have a New Imperial motor cycle, new last July, and run only 500 miles up to the present. Would you kindly give me some information as to the cause of the lubricating oil finding its way through the exhaust pipe (a long one) and spitting all over the back wheel, whether I give much or little oil? The tappets have the proper clearance. The oil also finds its way out of the ends of the silencer, as they are a bad fit. Can I put any kind of cement round to stop it?—W.B.

The trouble must be merely due to excessive lubrication, and the symptoms described in your letter are by no means uncommon. The remedy is to reduce slightly the quantity of oil you give to the engine. If the trouble persists, pack the silencer joint with asbestos string.

## Coal Gas.

**?** A short time ago I requested your advice re testing my engine with coal gas, and you advised me to connect my gas supply to the main air intake of the carburettor, but as I have already a hot air pipe fixed in that position I would be greatly obliged by your further advice and assistance in the following: (1.) Would it not answer the purpose if I removed the jet (Senspray) and connected the gas supply by a short pipe in place of the jet? (2.) What would be the approximate distance under load a 2½ h.p. machine would run per foot of gas? (3.) What is the power developed by coal gas compared with that of petrol? (4.) Is the deposit from coal gas more or less than that from petrol?—H.S.

(1.) There is no objection to your replacing the jet of your carburettor with a gas inlet, only this seems a rather elaborate method of achieving a very

simple end. There is not the slightest need to interfere with your existing petrol jet. (2.) This, of course, entirely depends on the normal fuel consumption of your engine; 250 cubic feet of coal gas approximately equal one gallon of petrol when used as a fuel in an engine. Consequently, if your machine does normally 100 miles to the gallon of petrol, it would do two-fifths of a mile to one cubic foot of coal gas. (3.) The power developed by coal gas is approximately 80% of that developed by petrol. (4.) The deposit from coal gas is less than that from petrol.

## Hub Gear Adjustment.

**?** I ride a 4 h.p. Matchless fitted with sidecar and Armstrong Mark VII. three-speed hub gear (marked on hub for 8 h.p.). I have just had it thoroughly overhauled and repaired at a cost of £9. The two higher gears work all right, but there is no "free" between middle and low gear, and the machine runs on middle gear when the lever is in the notch for low. The gear is adjusted correctly, as shown by being "free" when the lever is in the "free" notch, which is between middle and high. Will you kindly explain what is wrong with it?—P.A.W.

Evidently the gear is not adjusted correctly. We should recommend you to try again. So alter your lever that the low gear is engaged, then make sure that the gear goes properly into neutral, when we think you will find that the second and top speeds will be all right.

## Electric Lighting.

**?** I should be obliged if you would tell me whether it is practicable to adapt, without risk of injury, an M-L magneto on a two-stroke machine for lighting the front and rear lamps; and if so, how to make the necessary connections.—R.T.

It is quite possible to adapt the magneto to light both front and rear lamps as you suggest, but the wiring system must include a choking coil, and as the size, i.e., the resistance, of this is a matter which can only be determined after experiment, it is far better to purchase one of the sets on the market than to attempt to make one yourself unless you are a well qualified electrical engineer.

## Inferior Valves.

**?** I am riding a 7 h.p. twin-cylinder machine, and am having considerable trouble with breaking exhaust valves. So far these have been in the front cylinder. I bought the machine new a few months ago. The valve springs appear to be about the usual strength, and the tappet adjustment is correct.—A.S.

All we can suggest is that the valves are made of the wrong material or the springs too strong. The best remedy is to get hold of an old car valve of good quality and get an engineer to turn it down so as to be the correct size for your machine. Some of the valves used on such high-class cars as the Peugeot and Panhard would be suitable



VOLUNTEER MOTOR CYCLISTS.

Motor cyclists attached to No. 16 Company, Lancashire Motor Volunteer Corps. In the centre of second row is Capt. Beard, O.C., No. 16 Coy., and on his right is Capt. Rityema, adjutant for North-east Group, L.M.V.C.



### Storing a Motor Cycle.

?

I wish to store my motor bicycle and sidecar at home, and should like to know the best method of preserving the tyres, tubes, and belt, whether on the machine or off, wrapped up separately. The sidecar I propose to wash with water and remove the tar with butter and then polish. Would this be all right, or does water spoil the paint?—A.S.S.

Keep all three tyres off the ground, and keep a cover over the machine. Rub grease or vaseline over all bright parts. If you like you can remove the tyres altogether and store them in a damp, dark place, and the tubes in a box of French chalk. You may hang up the belt with the tyres. Your proposed method of treating the sidecar would be quite correct.

### Inland Revenue Tax Query.

?

I purchased a second-hand Velocette, and in order to bring it home let the dealer who sold it give me a new number over L.C.C. Using it solely for trade purposes of a credit draper, i.e., delivering parcels and incidentally collecting cash, I fitted a front carrier and had my name and address painted in with skeleton letters on the tank. I also had three long straps, holed every inch, to secure parcels to both rear and front carriers. Now the L.C.C. state a motor bicycle cannot be registered as a trade vehicle. This seems absurd to me, and I have told them flatly I shall defend any action they may take. Later they sent a representative of the Surrey County Council (a more reasonable person), and he only thought the lettering somewhat small, and also questioned whether I ought not to have my Christian name on tank. In writing my protest to the L.C.C. I quoted from "Motor Cycles and How to Manage Them," page 32, seventeenth edition, and shall use this book if I have to defend any action, as I do not believe the framers of the Act meant quibbling of this kind to be advocated. Another point I have to look at is their contention endangers my petrol licence. Your assurance, etc., will be appreciated. Can you tell me how to make a petrol gauge to fit in filler hole, with dial at top showing amount in tank? I think one was illustrated some weeks back, but my copy goes each Friday to a son in France. If you quote date I will send for one.—F.G.D.

If your motor cycle is used entirely for the conveyance of goods, you are not liable for the Inland Revenue licence, but you must carry on your machine your full name and address, painted in letters at least 1 in. deep. You state that the letters you are using are skeleton letters. We do not think skeleton letters are actually covered by the Act, and this can be the only point of question if they are not less than 1 in. in size. If the County Council persist in regarding the purposes for which you use the machine as other than business purposes, it is, of course, possible that your petrol licence may be endangered. This, however, we consider improbable. A home-

made petrol gauge for a motor cycle tank was fully described and illustrated in *The Motor Cycle* of June 14th, 1917, on page 534. If you obtain this issue, we think you will find the information given all your require.

### Particulars of Aero Engines.

?

Would you kindly inform me the name of the lightest aero engine per horse-power known to you, and state where the particulars can be got if published? In fact, I should esteem it a favour if you could let me have all particulars known to you, and say if these engines can be inspected anywhere in this district and if a permit is necessary.—R.W.

At the present time it is not advisable to enter into detailed descriptions of aero engines, nor to disclose any particulars of the leading types other than such particulars as are published in the normal course of things. As such particulars become available they are generally dealt with in the technical press, especially in *The Autocar* and *The Motor Cycle*. As regards your right to inspect any engines in the course of construction, you would have to obtain special permission before this could be done, and we very much doubt if permission would be granted unless you have some special grounds on which to demand it.

### IMPORTANT NOTICE.

#### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

### Belt Trouble.

?

I have a 1912  $3\frac{1}{2}$  h.p. Zenith motor cycle, standard gear, etc., as usually fitted. Would you please tell me how tight the belt should be for low gear and high gear? What sized jet should I use in the B. and B. carburetter, and please tell me of a suitable plug? A motor mechanic and I have recently had the engine down, and found it in perfect condition—timed correctly, magneto just remagnetised, in fact, everything is practically perfect. The faults are belt slip, no speed, and after about three miles at 25 m.p.h. the cylinder gets extremely hot.—S.A.H.

The belt is capable of adjustment by means of the special belt adjuster provided. Once you get this correct the belt will not slip on any gear in dry weather. The belt should have the same tension throughout the range of gears. We should say that a 32 jet would be suitable, and a plug of any well known make. Of course, the belt may be worn, and this would cause the trouble of which you complain. The engine ought not to get very hot if it is in good order, and perhaps the machine is suffering from too weak an exhaust valve spring. Be sure and use a good quality oil and sufficient of it.

### Strength of Spokes for a Lightweight.

?

Will 15 gauge spokes in 24 in. x 2 in. rims be strong enough for a  $2\frac{3}{4}$  h.p. two-stroke (rider's weight eleven stone, all solo work)? If 12 gauge are strong enough for a 7.9 h.p. twin with sidecar and engine with high compression, it seems to me that 15 gauge should be strong enough for a two-stroke. The belt rim would be built into the rim. This would ease the strain on the spokes. Of course, I am not desirous of taking undue risks, and I shall be guided by your opinion.—W.G.T.

15 gauge spokes might be strong enough for a 24 in. x 2 in. rim with a  $2\frac{3}{4}$  h.p. two-stroke engine, but there is no doubt that 12 gauge would be preferable. Spokes of the latter gauge on a 7 h.p. twin motor cycle with sidecar are, in our opinion, very much too light.

### Gear Ratios.

?

I have a  $3\frac{1}{2}$  h.p. Humber motor cycle, with two-speed epicyclic hub gear, free engine, and variable pulley, fitted with a light cane sidecar attachment.

(1.) What gradient might I reasonably expect the above outfit to negotiate (a) with 9 stone passenger and 9 stone driver; (b) with  $12\frac{1}{2}$  stone passenger and  $12\frac{1}{2}$  stone driver, (c) as a solo mount with 9 stone driver, without sidecar? (2.) Under above conditions, what gear ratios would be the best? (3.) What revolutions per minute should I aim at maintaining, on hills and on the level? (4.) At what speed should I approach a gradient of, say, 1 in 15? My usual riding country lies in a hilly part of Surrey.—F.

(1.) (a-b) With passenger, about 1 in 9; (c) solo, about 1 in 7. (2.) (a-b) Top speed of  $5\frac{1}{2}$ -6 to 1, (c)  $4\frac{1}{2}$  to 1. (3.) Obviously this question cannot be answered, as it depends upon the speed at which you desire to travel. In climbing hills, aim at obtaining the highest possible number of revolutions on each speed. (4.) Say about thirty miles an hour.

### RECOMMENDED ROUTES.

#### BARNSELY TO DURHAM.—S.E.

Barnsley, near Pontefract, Castleford, Aberford, Wetherby, Boroughbridge, Northallerton, Darlington, Durham. Approximately 100 miles.

#### GOLDTHORPE TO BLANDFORD.—W.J.

Goldthorpe, Conisborough, Tickhill, Worksop, Mansfield, Nottingham, Castle Donington, Ibstock, Hinckley, Coventry, Kenilworth, Warwick, Halford, Moreton-in-the-Marsh, Stow-on-the-Wold, Burford, Lechlade, Swindon, Marlborough, Pewsey, Upavon, Amesbury, Salisbury, Blandford. Approximately 220 miles.

#### PETERBOROUGH TO HOLYHEAD.—P.L.

Peterborough, Oundle, Market Harborough, Lutterworth, then on to Watling Street (which is signposted by the Royal Automobile Club), through Atherstone, Weeford, Gailey, Weston, Crackleybank, Shrewsbury, Llangollen, Corwen, Pentre Voelas, Bettws-y-Coed, Bangor, Holyhead. Approximately 215 miles.



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Smart, yet  
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Perfectly  
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PLANNED on the saddle, so to speak, these garments combine smartness with perfect ease and freedom.

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They are guaranteed absolutely waterproof, and the quality is unequalled anywhere for the price.

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359-361, Euston Road, N.W.

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90 & 92, Cross Street.

Glasgow :  
72, St. Vincent Street.



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd.,** and crossed **& Co.**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons, may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X868]

LATEST A.J.S. Combination in stock, 700x80 tyres; £111/12/6.—Cross, Agent, Rotherham. [X8738]

1916 2 1/2 h.p. A.J.S., complete, Lucas lamps, horn, etc.; £48.—Cross, Agent, Rotherham. [X8739]

A.J.S., 6 h.p., latest 1917 Service model; immediate delivery.—Pepper's Garage, Shelton, Stoke-on-Trent. [X8719]

1915 4 h.p. A.J.S., Montgomery sidecar, spares, perfect condition; £58.—33, Kendrick Rd., Reading. [X8765]

1916 6 h.p. A.J.S. Combination, perfect order, tools; what offers?—Bousfield, Westbury, Wiltshire. [X8768]

A.J.S.—We have always large stock of latest models on hand; send us your enquiries.—Parker's, Branshawgate, Bolton. [X8804]

A.J.S., brand new, 6 h.p., painted khaki, never ridden; what offers? owner ordered abroad.—Box 1,443, c/o The Motor Cycle. [X8717]

A.J.S. Combination, 6 h.p., 1916, 3 lamps, horn, spare wheel, condition and appearance as new; 88 gns.—4, Bentscliffe Lane, Leeds. [X8730]

A.J.S., 6 h.p., and sidecar, one of the last 1915 models turned out; price only 80 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [X931]



Query EVANS on any Lightweight problem.

Get the benefit of his experience as well as his most liberal exchange allowances.

Here's a selection—

A.J.S., 6 h.p., 1917, Special Model	£91 6 0
CONNAUGHT, 2 1/2 h.p., 2-st.	£28 17 0
CONNAUGHT, 2 1/2 h.p., 2-speed	£36 6 0
ENFIELD, 2 1/2 h.p., 2-sp., 2-st.	42 gns.
ENFIELD, 3 h.p., twin, 2-speed	55 gns.
ENFIELD Combination	90 gns.
JAMES, 4 1/2 h.p., 3-speed	£79 0 0
JAMES, 4 1/2 h.p., 3-speed, complete with Sidecar	£99 0 0
JAMES, 3 1/2 h.p., 3-sp., twin.	£79 0 0
JAMES, 3 1/2 h.p., 3-sp., twin, T.T. type	£79 0 0
JAMES, 2 1/2 h.p., 2-sp., 2-st.	£50 0 0
NEW IMPERIAL, 2 1/2 h.p., 2-speed	£40 19 0
NEW IMPERIAL, 2 1/2 h.p., cl.	£48 6 0
NEW IMPERIAL, lady's	£50 8 0
NORTON, 1917, special 4 h.p., 3-speed	75 gns.
ROVER, 3 1/2 h.p., countershaft 3-speed	£80 0 0
ROVER, 3 1/2 h.p., Sidecar Combination	£106 5 0
ROVER, 3 1/2 h.p. T.T., hand-cont'd Philipson pulley	£67 10 0
ROVER, 3 1/2 h.p. T.T., without Philipson pulley	£62 10 0
ROVER, coachbuilt Sidecar	£26 5 0
ROVER, 5-6 h.p. Twin	£97 10 0
ROVER, 5-6 h.p. Twin, with coachbuilt Sidecar	£124 5 0
CALTHORPE-J.A.P., 2-speed	£39 18
CALTHORPE, lady's, 2-speed	£37 16
CALTHORPE, 3 1/2 h.p., coach Combination	72 gns.

You are free to inspect any or all of these at your leisure. If at a distance, 'phone or write.

Note the address:

**P.J. EVANS**

87-91, John Bright Street, BIRMINGHAM.

'Phone: Mid. 662. Wires: Lylcar, B'ham.

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**PUNCTURE SEALER**  
 automatically repairs tyre punctures as they occur without even stoppage of the car or cycle. Send 2/- for sufficient to treat a motor cycle tyre, 1/- for ordinary cycle tyre. Postage 4d. extra.  
**PETROL PILLS.**—One pill dissolved in two gallons of Petrol. Paraffin, or substitute, gives greater mileage, makes easy starting, and keeps engine cool and clean. 2/- for 2/-, 5/- for 5/6. Postage 4d. extra.  
**THERE'S NOTHING TO EQUAL THEM.**  
 Stocked by all leading motor agents, or direct from  
 The Atkinson Manuf'g. Co., Ltd., Guildhall St., Preston.

**Photography**  
 and Focus  
 Every Wednesday Twopence.

## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

1916 6 h.p. A.J.S. Combination, lavishly equipped—£85.—George Newman and Co., 307, Euston Rd., London. 'Phone: Museum 1568 and 1569. [X137]

A.J.S., 2 1/2 h.p., 1914, 3-speed, clutch, T.T. bars, head lamps, generator, rear lamp, tools, sound tyre machine perfect throughout; £40.—Advertiser, 156, G Portland St., W.1. [X110]

A.J.S., 6 h.p., 1916 Combination, lamps, horn, speed wheel, wind screen, hood, toothboard, in fine condition; £80.—F. Greenhalgh, 294, Tyldesley Rd., Atherton, near Manchester. [X870]

A.J.S. Motor Cycles—Immediate delivery of special 1917 model, complete, detachable wheels, 700x80 tyres; £91/6.—P. J. Evans, Sole Birmingham Agent 87-91, John Bright St., Birmingham. [X127]

A.J.S. Motor Cycles; immediate delivery of special 1917 model, complete, detachable wheels, 700x80 tyres; £91/6.—P. J. Evans, 87-91, John Bright St. Sole agent for Birmingham and district. [X868]

RIDER TROWARD and Co., 31 and 78, High St. Hampstead—1916 A.J.S. de luxe combination 6 h.p., 3-speed, detachable wheels and spare, Gloria sidecar, hood, screen, 3 lamps, etc.; 105 gns. (J) [X154]

A.J.S. Motor Cycles; delivery from stock of latest 6 h.p. model, detachable wheels, 700x80 tyres; 60 and combinations in stock; also 1916 4 h.p. A.J.S. 60 and combination in stock.—Marston, 31, Bridge St. Chester. [X875]

### Alldays.

ALLDAYS, 2 1/2 h.p. Villiers, single speed; £12.—Shaw 89, Somerset Rd., South Farnborough, Hants. [X866]

ALLON, 2 1/2 h.p., single speed, splendid condition 1915/17/6; no petrol.—Hewett, Grocer, Canterbury [X151]

1916 2 1/2 h.p. Alldays Allon, 2-speed countershaft, good condition; £27.—Cook Bros., Cam Cycle Works Newmarket Rd., Cambridge. [X867]

ALLON (new), 2 1/2 h.p., 2-stroke, all models in stock for immediate delivery; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd. London, S.W.1. [X147]

### Ariel.

CROW Bros., Guildford.—Ariel, latest 3 1/2 h.p., 3-speed countershaft models in stock. [X104]

FOR Sale, Ariel 3 1/2 h.p., 3-speed; Hummerette; both in good condition.—Cooper, Engineer, Romsey. [X115]

ARIEL, 5-h.p., 1914, 3-speed countershaft, clutch and kick starter, C.B. sidecar, good condition throughout; £45.—Dutton, Rose Bank, Leicester Rd. New Barnet. [X863]

ARIEL (new), 3 1/2 h.p., 3-speed countershaft gear clutch, and kick-start, decompressor, patent spring seat pillar; £72; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [X141]

### Arno.

ARNO, 3 1/2 h.p., single speed, lamps; £20, a bargain. Parradine, Hunts Farm, Margeret Roding, Essex [X144]

## Auto-Wheels

GENUINE Wall Auto-Wheel, little used, splendid condition; £8/10.—Murray's, 37a, Charles S Hutton Garden, Holborn. [X871]

1915 Auto-Wheel de Luxe, as new, not used for 12 months, perfect; £6, or exchange good cycle, 190, Divinity Rd., Oxford. [X151]



## MOTOR CYCLES FOR SALE.

## Bat.

AT-J.A.P. 3½-4h.p., all complete, less mag.; £7/15.  
—Wandsworth Motor Exchange, Ebnar St., Wandsworth (Town Station). [1500]  
AT-J.A.P. 1914 5h.p. Coach Combination, 3 speeds, kick starter, speedometer, lamps, horn, mirror, wind on, tools, spares, splendid condition; £45.—Challis, Altharthing Lane, Wandsworth. [X8736]

## Blackburne.

16 3½h.p. Blackburne, 3-speed countershaft, Sturmay-Archer, T.T. footrests, 3 lamps, electric speedometer, Attwood paraffin vaporizer, tyres new, recently overhauled by makers, mechanical condition and appearance perfect; £58.—Box L5,103, c/o The Motor Cycle. [1552]

## Bradbury.

RADBURY, 1915, 4h.p., 3-speed, new coach sidecar; £58.—Dunstan, Salcombe, S. Devon. [X8802]  
13-14 Bradbury, 4h.p., Bosch watertight mag., dropped frame, good tyres, overhauled and re-oiled; bargain, £14.—24, Tudor Gardens, Barneas. [1494]  
RADBURY Combination, 1914, 4h.p., countershaft gear box, handle-bar clutch, kick starter, chain, lamps, horn, luggage grid; nearest £35.—Advers, 28, Wesley St., Fallowfield, Manchester. [1476]

14 Bradbury, 5h.p., in splendid condition, with smart, roomy sidecar, would be suitable for bus; £62/10; would exchange with cash for smart sport-car, 2 or 4-seater.—J. L. Mitchell, Manor House, [X8664]

## Brough.

ROUGH, 1913, 3½h.p., free engine clutch, not ridden 1,000 last 3 years, sacrifice £27; Bosch magneto, almost new, £3.—38, Britannia Rd., Bedford. [1486]

## B.S.A.

S.A. 1915 Combination; £55; in perfect condition.

S.A. 1916 Combination; £60.—Percy and Co., 337, Euston Rd., London. [1564]

S.A. Combination, 1914-5, countershaft 3-speed, fully equipped, new condition; 45 gns.—Kington, Hammersmith Rd., London, W. [1432]

15 B.S.A. Model K, King of the Road lamp, Lucas horn, Bates extra heavy tyres, in thorough good; 40 gns.—Moore, Red Lion, Sleaford, Lincs. [X8750]

S.A., late 1913, 2-speed, free engine, Gloria sidecar, lamps, horn, etc., good running order and condition; £40.—Woodman, Chemist, Burnham, Som. [1387]

16 B.S.A., 4½h.p., C.B. sidecar, chain-cum-belt, 3 new tyres, enamel plating, mechanical condition new, lamps, spares, etc.; lowest £65 cash.—Uley, on St., Wellingborough. [X8709]

S.A., 1916½, 4½h.p., 3-speed Model K, and luxurious Phoenix sidecar, new May, combination new; cost £90, accept £75; see Exchange.—198, Listering Rd., Northampton. [X8550]

16 4½h.p. B.S.A., with G.K. convertible sidecar, Miller lamp set, Lucas straight horn, in splendid condition, a perfect business man's outfit, complete; ns.—Gibbs, Ludford, Lincoln. [X8528]

S.A., 1917, 4½h.p. Model H, all chain drive, 3-speed countershaft, Lucas horn, coachbuilt sidecar, luggage carrier, spares, quantity petrol and substitutes; near Birmingham.—Box 1,451, c/o The Motor Cycle. [X8759]

S.A., 1916, 4½h.p., 3-speed countershaft, chain-cum-belt, combination as new, 3 Lucas lamps, watch, odometer, wind screen, luggage carrier, 25 spares; bargain, £60.—Watson, 32, Lissenden Gardens, Oak N. [1454]

S.A., 1914 (late), and No. 1 B.S.A. sidecar, countershaft gear, chain driven, 4½h.p., fitted with vaporizer to run on paraffin, head, back, and sidecar lights, and screen, speedometer, and mechanical horn, recently overhauled and decarbonised, tyres in first-class condition; £60.—Below.

20 B.S.A., 1914 (late), and Canoelet sidecar, countershaft gear, chain driven, 4½h.p., run on petrol and 50% paraffin, electric head, back, and sidecar lights, speedometer, and mechanical horn, tyres in first-class condition; £55.—Day, 1, Minford Garden, West Kensington, W.14. [1395]

15 4½h.p. B.S.A., chain-cum-belt, and Hercules sidecar, done 3,700 miles, new condition, new 3/4 inch cord to back, 2½ ditto front and sidecar, Lucas lamp, mechanical horn, Stewart speedometer, spare 3 chain, tyre, etc., 100 m.p.g.; £58.—Ortel, Bryon (facing Locket Rd.), Wealdstone. [1426]

S.A. 1915 Model H. Combination, in perfect condition, very little used; any trial; new Palmer coat, as best lamps, Watford speedometer, Roby mufflers, chains, Lucas horn; seen any time by appointment; worth of spare parts and accessories; £75 the lot, vell's Dining Rooms, 468, Harrow Rd., W.9. [1444]

## Calthorpe.

ALTHORPE, 1915, 2-stroke, 2-speed, lamps, horn, speedometer, in good condition; must sell quickly; —Smith, 14, Bargery Rd., Catford. [1369]

16 Calthorpe-J.A.P., 2½h.p., all black model, long exhaust, speedometer, mechanical horn, exceptional condition; £30.—Holmwood, The Green, Feltham [1473]



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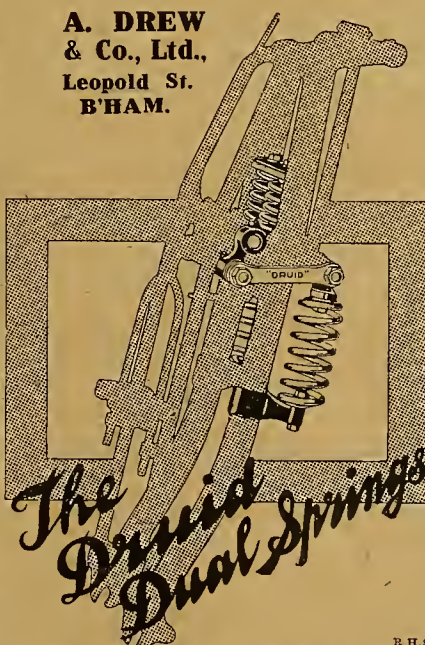
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## MOTOR CYCLES FOR SALE.

## Campion.

CAMPION, 1917, 8h.p. J.A.P., 4 speeds, Jardine gear box, combination fully equipped, cost £139, not run 1,000 miles; £85.—Percy and Co., 337, Euston Rd., London. [1558]

## Clyno

CLYNO, 1915-14, 6h.p., good sidecar, 2 new tyres, spare wheel, and all accessories; £52/10, lowest.—M.J., The Chalet, Bedford Park, W. [1490]

CLYNO Combination, 2-speed, 5-6h.p., spare 2-speed gear, 2 spare covers (one new), 6 spare tubes, large quantity of tools, spares, etc.; £45.—Whitlock, 28, Brook St., W. [1487]

CLYNO 1913-14 Combination, 5-6h.p., 3-speed, spare wheel, lap set, Cowey speedometer, horn, etc., price £59/10; 1914-15 ditto, £62/10; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C. [X8790]

## Connaught.

CONNAUGHT, 2½h.p., 1916, 2-stroke, complete with head lamp, generator, rear lamp, horn, etc., only done small mileage; £26.—Mebes and Mebes, 156, Gt. Portland St., W. [1535]

## Coventry Eagle.

COVENTRY Eagle, 2½h.p. Villiers 2-stroke engine, 2-speed countershaft gear, Brampton forks, Dualop non-skid tyres; £42; offered on behalf of owner; absolutely unused.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1493]

## Douglas.

I CAN Supply You with a 1917 Douglas.—J. Gourlay, Fallowfield, Manchester. [19858]

DOUGLAS, 1914, 1915, 1916 in stock, many others.—Griffio's, 89, Gt. Portland St., W.1. [19964]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [14749]

DOUGLAS, 1913, 2½h.p., 2-speed, splendid condition; £25.—Bidmead, 8, Eccleston Place, S.W.1. [X8741]

DOUGLAS, 1914, 2-speed, magnificent condition; 33 gns.—Julians, 84, Broad St., Reading. Phone: 1024. [0927]

DOUGLAS, 2-speed, clutch, all fittings, run 800 miles, guaranteed; £32.—51, Maplethorpe Rd., Thornton Heath, S.E. [1452]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [15855]

DOUGLAS, 2½h.p., all black, 1915, 2-speed, accessories, overalls; £30, or near offer.—Seaview, Ardside, Westmorland [X8627]

DOUGLAS, 1914, 2½h.p., 2-speed, clutch, kick start, in splendid condition; a bargain for £32, no offers.—Ayles, Portmadoc. [X8659]

19 Douglas, 2-speed, new Dunlops, all accessories, splendid condition; bargain, £32/10.—Godts, 55, Audley Rd., Hendon. [1491]

1915 2½h.p. 2-speed Douglas, Colonial Model, lamps, horn, spares, excellent condition.—Browne, Heddon Court, New Barnet, (D) [X8782]

DOUGLAS, 1916, T.T., 2½h.p., 2-speed, little used, original tyres, guaranteed perfect; £48.—Garland, Ironmonger, Warrington. [X8749]

2½h.p. Douglas, late 1914, perfect condition, unused 24 last 18 months; 38 gns.; appointment.—72, Longridge Rd., Earl's Court, S.W. [1441]

4 h.p. Douglas Combination, 1915-16, 3-speed, clutch, kick starter, excellent condition; £58.—Seen Douglas Bros., 39, Newman St., W.1. [X8629]

DOUGLAS, 1913, 2-speed, T.T. model, Binks, and spare tank, fully equipped, nearly new tyres and belt; £34.—Albert Deans, Baldock. [1510]

DOUGLAS 2½h.p. Twin, 2-speed, just laid out £9 on it; sacrifice £19, or exchange higher power.—Brown, Rangemore Hall, Burton-on-Trent. [X8743]

DOUGLAS, 1915, T.T., 2-speed, lamps, horn, etc.; owner in France with R.F.C.; accept best offer over £30.—123, Queen's Rd., Finsbury Park, N.4. [1394]

DOUGLAS, late 1913, 2½h.p., 2-speed, free, Amac, Lucas lamps, spare belt, tube, chain, etc.; any examination; £37.—Shrives, Drayton, Shalford, Guildford. [X8531]

DOUGLAS, 2½h.p., 1915, Colonial Model, 2 speeds, electric lighting, good tyres, in good condition throughout, fully equipped; £45.—Mebes and Mebes, 156, Gt. Portland St., W. [1537]

DOUGLAS Motor Cycles.—We can deliver 1917 Model W on receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol (Wholesale and retail). [0923]

DOUGLAS, 1912, 219/19; 1913, £31/10; 1915, £45; prompt delivery of new 1917 models to doctors, farmers, etc., against Ministry of Munitions permit.—Motor Exchange, Horton St., Halifax. [1412]

1917 2½h.p. Douglas, Model W, hand-controlled clutch, kick start, latest improvements, £54, plus 20%; also Models U and V, 1916 specification, £50, plus 10%; absolutely new; immediate delivery against priority permits for doctors, farmers, war and munition workers.—How and where to apply for full particulars, write the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [1410]



## MOTOR CYCLES FOR SALE.

## Douglas.

**1912** 2½ h.p. Douglas, new engine 1914, in good running order, new back tyre, 2-speed, free engine clutch, with kick starting pedal, lamp, with generator, complete; £25.—Cottrell, 38, Congleton Rd., Biddulph, Staffs. [X8622]

**DOUGLAS**, 2½ h.p., 1915, 3-speed model, lamp, generator, horn, speedometer, tools, in splendid mechanical condition; £45; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [X482]

**BEST** Bargain this week.—Genuine late 1915 (bought new 1916) 4 h.p. Douglas combination, 3-speed, kick start, all accessories, all tyres very good; this outfit has only been used week-ends, and is equal to new; 68 gns.—9, Markham Rd., Chesterfield. [X8726]

## Edmund.

**EDMUND**, 1918, spring frame model; 52 gns.—Marston, 31, Bridge St., Chester. [X8755]

**EDMUNDS** (new), 2½ h.p. J.A.P., Royal Enfield 2-speed, spring frame, double tank, strongly built machine; £54/12/6; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [X481]

## Enfield.

**ENFIELD** 3 h.p. 1917 Semi T.T. Model; £50.—Marston, 31, Bridge St., Chester. [X8754]

**ENFIELD**, 3 h.p., 1915, done 700 miles, Binks, Stewart.—9, St. John's Rd., Eastbourne. [X8703]

**1916** Enfield Combination, 6 h.p., Lighting model; £95.—Terry, 80, Bancroft, Hitchen, Herts. [X9779]

**ENFIELD** Combination, 6 h.p., 1916, equal to new, guaranteed; take 75 gns.—280, Camberwell Rd., S.E.5. [X397]

**ENFIELD**, 3 h.p. two, 1916 model, practically equal to new; 40 gns.—Julians, 84, Broad St., Reading. [X928]

**ROYAL** Enfield, 2½ h.p., 2-stroke, 2-speed, standard model, perfect condition; £29, offer.—19, Church St., Blackpool. [X8725]

**ENFIELD** Combination, 1916, dynamo lighting, hood, screen, hardly used; £85.—51, Maplethorpe Rd., Thornton Heath, S.E. [X451]

**1917** 6 h.p. Enfield Combination, lavishly equipped; £85.—George Newman and Co., 307, Euston Rd., London. Phone: MUSEUM 1568 and 1569. [X374]

**1915** 6 h.p. Enfield Combination, just overhauled, low mileage, speedometer, horn, lamps, new tyres; £65.—Burridge, White Lodge, Gerrard's Cross. [X8666]

**ENFIELD** 1916 Dynamo Combination, splendid condition; £98/10; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C. [X8793]

**ENFIELD** Combination, 6 h.p., 1916, hood, screen, speedometer, lamps, and full kit of tools, new condition; £75, no offer.—38, Broadway, Deptford, London, S.E. [X385]

**ENFIELD**, 1916, 3 h.p., complete with Lucas King of the Road headlight, Miller rear light, and Lucas horn, tools, in topping condition; £45.—81, Easemore Rd., Redditch. [X8762]

**6 h.p.** Enfield and Sidecar, late 1914, but not used 18 months owing to war, complete with electric lamps and all accessories, in perfect order, petrol given; £60.—Lieut. Fry, 33, Avenue Rd., Grantham. [X8665]

**ENFIELD**, 1916½, 3 h.p., perfect, Stewart speedometer, mechanical horn, watch, complete set of tools, very fast machine, been little used; £40.—M. Wexler, 89, Biggar St., Chesham, Manchester. [X8533]

**ENFIELD**, 6 h.p., 1916-17, low mileage, all lamps, Lucas horn, tyres practically new, wind screen to sidecar; £77/10.—Apply, Lawrence, Escella Works, Heatherley St., Evington Rd., Stoke Newington, N.16. [X438]

**ENFIELD**, 2½ h.p., 1914, 2-speed, kick starter, all chain drive, Enfield grey, tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout; £32/10.—Mebes and Mebes, 156, Gt. Portland St., W. [X536]

**1917** 2½ h.p. 2-speed 2-stroke Royal Enfield, runs about 800 miles, tyres, chains, etc., as new, Lucas head and tail lamps, machine in perfect order; cost £48, will accept £38.—Capt. Nicholson, 3/49, Drayton Gardens, S. Kensington, S.W.10. [X528]

**ENFIELD** 6 h.p. 1916 Combination, Palmer cord light car tyres all round, large head lamp, generator, rear lamp, luggage carrier to sidecar, very nice condition throughout, and fully equipped; £82/10.—Advertiser, 156, Gt. Portland St., W.1. [X7904]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1917 Enfield, 6 h.p., 3 in. tyres, well equipped, 82 gns.; also 1917 3 h.p. Enfield, ridden 40 miles only and unscratched, 48 gns.; also 1916 Enfield 2-stroke, 2-speed, clutch, 27 gns. (D) [X545]

**ENFIELD** 1916-17 6 h.p. Dynamo Combination, hood, screen, speedometer, 105 gns.; also 1916 ditto, 105; also 1916 standard model, sold new May, 1917, with hood, screen, speedometer, quite like new, ridden only 500 miles, £115; also 6 h.p. combination, condition perfect; also 1916 6 h.p. combination, with all accessories, beautiful condition, £78/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [X516]

## SPARE PARTS

In view of our difficulty in overhauling Second-hand Machines, due to the scarcity of skilled labour, we have decided to offer the parts of such machines as spares.

All parts are, of course, second-hand, and offered subject to being unsold. Prices are those in the respective manufacturers' current catalogue (plus 50%), and in preference to entering into lengthy correspondence we send all parts on approval, conditional upon our clients bearing all postage or carriage charges if not approved of and returned within three days of receipt.

All remittances should include sufficient to cover postage or carriage charge.

If no reply be received to any enquiry, our clients may know that we cannot supply the part.

At the moment we are dismantling the following machines, and can offer most of their respective parts:

1914 and 1915 GLYNCO, 6 h.p.

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## MOTOR CYCLES FOR SALE.

## Excelsior.

**BRITISH** Excelsior, 1913-14, 3-speed, Binks, coachbuilt sidecar, perfect condition; £43.—Clay, Walgrave, Northants. [1]

**RIDER TROWARD** and Co., 31 and 78, High Hampstead.—1917 British Excelsior, 8 h.p. J.A. Sturmer 3-speed countershaft, underslung coach car, Lucas dynamo lighting outfit; cost £115, 88 (D) [1]

## F.N.

**F.N.**, 5-6 h.p., 4-cyl., 1913 (not used for two years) footboards, foot clutch, and brakes, disc wheel, Zenith shaped tank, celluloid semi T.T. handlebars, overhauled and cannelled all black, spare valves; 2, Saxmundham district.—Box 1,448, c/o The Motor Cycle [X3]

## Harley-Davidson.

**HARLEY-DAVIDSON** 1916 Combination, in excellent nice condition; £70.—Percy and Co., 3, Euston Rd., London. [1]

**1916** Harley-Davidson Combination, 7-9 h.p., electric model; £89/10.—Eles and Co., 15-16, Blenheim Gate Av., Camomile St., E.C.3. [10]

**J. A. STACEY**, 12, Ecclesall Rd., Sheffield, Harley-Davidsons; P. and H. jump seats, special made for H.D. £3/3, carriage paid. [9]

**HARLEY-DAVIDSON** Combination, 1915, electric model, perfect condition, complete with spare £65.—28, Granville Gardens, Shepherd's Bush. [1]

**HARLEY-DAVIDSON**, 1914, Millford Empress car, fully equipped, perfect condition; any try £50.—Cowen, 15, Carlton Terrace, Childs Hill, N.W. [X8]

**1917** Model Harley-Davidson, splendid condition; £115; Swan sporting sidecar; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C. [X8]

**1917** Harley-Davidson, magneto model, khaki, fit with special Harley Montgomery sidecar, magnificent combination; immediate delivery; £130.—Parks Bradshawgate, Bolton. [X8]

**RIDER TROWARD** and Co., 31 and 78, High Hampstead.—1917 Harley-Davidson, 7-9 h.p., speed, dynamo lighting, Phoenix sidecar, with sliding seat, good order; 129 gns. (D) [11]

**HARLEY-DAVIDSON** Combination, 1915, electrically equipped, aluminium disc wheels, all sound and screen, etc.; £75; extended payments or exchange.—Service Co., 292, High Holborn, London, W. [X8]

**HARLEY-DAVIDSON** Combination, electric model, purchased August, 1916, speedometer, and spare parts, the whole outfit is in splendid condition; mileage 5,004; best offer over £66.—124, North St. Rd., West Kensington, W. [1]

**1916** Harley-Davidson and Harley De Luxe sidecar, run under 2,000 miles, Palmer cord tyres, scratched, Bosch mag., lamps, full equipment, spares, guaranteed perfect; £87/10.—Oram, 10, Park, The Hyde, Hendon, N.W.9. [9]

## Hazelwood.

**HAZLEWOOD** 1914-15 Combination, 5-6 h.p. J.A. cogine, 1917 Sturmer-Archer gear box, speedometer, Lucas lamp and horn, Millford C.B. sidecar, hood and screen, new tyres; £55.—28, Cromwell Rd., Weymouth. [12]

## Henderson.

**HENDERSON**, 1915, 4-cyl., 10 h.p., coach sidecar, disc wheels, smart turnout; 79 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. [13]

## Humber.

**HUMBER**, 3½ h.p., 2-speed, and coach sidecar; £29/10.—Motor Exchange, Horton St., Halifax. [14]

**1912** 3½ h.p. Humber, 2-speed, and sidecar, good condition; £20.—Bell, 41, Goldsmith Av., Mtr Park. [14]

**HUMBER**, 3½ h.p., 1912, 2 speeds, F.E., handle and new Drendonought tyres, runs on paraffin; 2 nearest.—91, Houghton Rd., Grantham. [X86]

**HUMBER**, 1912, 3½ h.p., 2-speed, handle start, coachbuilt sidecar, cylinder rebored, new piston rings fitted last July; very powerful; offers.—Hamilton 544, Duke St., Glasgow. [X86]

**HUMBER**, 1915, 3½ h.p., mag., 3 speeds, kit nearly new; 35 gns.; easy terms, quarter down, monthly payments.—Wandsworth Motor Exchange, Eb St., Wandsworth (Town Station). [14]

**HUMBER**, 3½ h.p., wicker combination, kick start, Bosch, speedometer, 3 speeds, 2 spares and full also policy on above, value £55 (renewed end of Aug 1917); owner incapacitated in war; 30 gns., or near.—H.N.B., 178, Manor Lane, Lee, S.E.12. [14]

## Indian.

**INDIAN**, 1916, 7-9 h.p. Powerplus, in nice condition; 52 gns. [15]

**INDIAN**, 5 h.p., 3 speeds, run 500 miles only; £55.—Percy and Co., 337, Euston Rd., London. [15]

**INDIAN**, late 1914, twin, 2 speeds, and clutch; beautiful 20 gns. coachbuilt sidecar, perfect; 5 gns. £58.—M. S. M. Cooper, Pembroke Mews, Hall St., S.W.1. [X87]



# MOTOR CYCLES FOR SALE.

## Indian.

NDIAN, 1913, 7-9h.p., 2-speed, and 1917 coach sidecar; 245.—Motor Exchange, Horton St., Halifax. [1414]  
 b.p. 1916 Powerplus Indian, electric lamps and horn, 3-speed, very fast, perfect condition, spring frame, speedometer; 255.—exchange good Triumph or Sunbeam combination.—190, Divinity Rd., Oxford. [1272]  
 NDIAN, 1915, T.T., 7-9h.p., disc wheels, very smart, 33 gns.; 1914 7-9h.p., 2-speed, spring frame, 34 gns.; 1912 5-6h.p. clutch, 26 gns., with good sidecar; gns.—Rider Troward and Co., 51 and 78, High Hampstead. (D) [1541]  
 NDIAN Latest Mod. Powerplus Combination, magneto-dynamo lighting, T.T. bars, fully equipped, various turnout, machine has been kept in stock awaiting owner's return. Listed at 2120, accept 298.—Parker's, Bradshawgate, Bolton. [X8808]

## Ixion.

XION-VILLIERS 2-stroke, 1914-15, fitted for and runs grand on paraffin; soldier on service; first h. sacrifice 213/10.—Longfield, Plumber, 16, College H., Huddersworth, Birmingham. [X8671]

## James.

AMES 1915 4½h.p. Combination, kick start, 3 speeds, electric lamps; 240.—10, St. Loy's Rd., Tottenham. [1511]  
 AMES 1916 Combination, done 900 miles; 263, nearest.—Skinner, Elsie Villa, Lansdowne Av., High-on-Sea. [1472]  
 AMES, latest 5-6h.p., Service model, twin-cyl. 3 speeds; immediate delivery.—Pepper's Garage, Shelton, Stoke-on-Trent. [X8720]  
 AMES, all models, new and second-hand; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C. [X8792]  
 AMES 1914 Combination, perfect condition, speedometer, spares, and accessories; 240.—28, Granville Gardens, Shepherd's Bush. [1507]  
 AMES 3½h.p. Twin, chain drive, kick start, little used; list price 269/10, sell 240, lowest.—Edwards, 40, Bransford Rd., Burton-on-Trent. [X8744]  
 AMES 2-speed Motor Cycle, fitted with Lucas lamps, horn, and leg guards, in new condition; 230, bargain.—Box 1,441, c/o The Motor Cycle. [X8630]  
 AMES 1916 Combination, Lucas dynamo lighting, Stewart speedometer, price 278; James 1916 lightweight, 2½h.p., 2-speed; 235; extended payments exchange.—Service Co., 292, High Holborn, London, W.C. [X8789]  
 1916 (August) James, 4½h.p., and Millford coach sidecar, electric lighting, acetylene auxiliary, Terrys, Stewart horn, watch, and tools, mileage 4,000, in excellent condition; 248.—S. Gowler, Providence House, Wrexham, Walsby. [1512]  
 AMES, the latest 1918 5-6h.p. twin, actually in stock; also 1913 4½h.p. solo model, 222/10, with accessories; also 1916 No. 6 combination, with special silencer for sidecar, speedometer, lamps, and horn, 273, like new.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [1515]

## Lea-Francis.

EA-FRANCIS (late type), coachbuilt combination, 4-5h.p. J.A.P. mag., 2 speeds, kick, enclosed chain drive; 59 gns.; easy terms quarter down.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [1498]  
 EA-FRANCIS, late 1914, 3½h.p. J.A.P., Bosch, Amac, unused last 18 months, condition perfect, 5, lowest; also light suitable sidecar, C.B., if required, 25.—Optician, 28, Mitcham Rd., Tooting Broadway. [1399]

## Levis.

EVIS, 1914, 2½h.p., new tyres and belt, 100 m.p.g.; 218.—Webb, Sandercock, Flintshire. [X8707]  
 1915½ Levis Popular, real nice condition; 222, or nearest.—Snell, Griffiths, Chippenham. [1372]  
 EVIS, 2½h.p., Model de Luxe, 2-speed gear, condition as new, only ridden about 700 miles; 232/10.—Hastor, Grimsby. [X8778]  
 1916 Levis, 2½h.p., equal new, Stewart trip speedometer, 2 lamp sets, horn, etc.; 225.—7, Vale Road, King's Rd., Chelsea, S.W. [1505]  
 EVIS, 2½h.p., single, Bosch mag., Senspray carburettor, engine perfect, nice clean condition throughout, new heavy Dunlop tyres, aluminium footboards; complete for 225.—Shop Goch, Portmadoc. [X8660]

## Lincoln-Elk.

1914 Lincoln-Elk, 4½h.p., 2-speed, and clutch, kick starter, and sidecar; 225.—Palmer, 138, Church St., Battersea, S.W.11. [1520]

## Matchless.

ATCHLESS Combination, late 1913, coach body, condition as new; 250.—Owen, 19, Battersea Rise, V.11. [1403]  
 ATCHLESS 2B, M.A.G., late 1915, and coach sidecar, condition perfect.—Parker, 3, Park Rd., Newnes, S.E. [1428]  
 ATCHLESS 8h.p. Combination, new; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C. [X8791]



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1917 5-6	JAMES, W.O. Model	£84 0
1917 2½	IMPERIAL-J.A.P., clutch model	£50 0
1917 2½	IMPERIAL-J.A.P., 2-speed	£42 10
1917 2½	ROYAL RUBY, 2-speed	£36 10
1917 2½	LEVIS	£32 0
1916 2½	WOLF, 2-speed	£34 10

## SECOND-HAND.

1914 6	A.J.S. Combination	£75 0
1916 8	ENFIELD Combination, hood and screen	£78 0
1915 7-9 (2)	HARLEY - DAVIDSON and Sidecars	each £68 0
1916 10	ZENITH and Sporting Sidecar	£70 0
1916 3½	SCOTT and Sidecar	£50 0
1916 3½	RUDGE MULTI	£35 0
1917 2½	LEVIS	£25 0
1917 2½	IMPERIAL-J.A.P., 2-speed	£36 0
1915 7-9	INDIAN and Sidecar, hood and screen	£70 0
1915 2½	2-stroke TRIUMPH	£28 0
1914 3	ENFIELD	£35 0
1913 2½ (2)	DOUGLAS, 2-speed	each £35 0

# MOTOR CYCLES FOR SALE.

## Matchless.

WE can give immediate delivery of the new W.O. Model Matchless combination; 2120.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0992]  
 MATCHLESS.—Immediate delivery from stock three latest 8h.p. War Model combinations, with spare wheel complete; 2120.—Parker's, Bradshawgate, Bolton. [X8805]  
 7h.p. 1915 Matchless Motor Cycle and sidecar combination, in excellent condition, all 3 tyres nearly new; price 270.—Messrs. Haynes Bros., Ltd., King St., Maidstone. [1329]  
 MATCHLESS War Model 1917 Motor Cycle and sidecar, complete, with 3 Lucas lamps, Klaxon horn, spare wheel and tyres equal to new and guaranteed, only been used for demonstration; 2110.—Walker, 44, Plumstead Rd., Plumstead, S.E.13. [1445]

## New Hudson.

NEW Hudson Combination, 3½-4h.p., 3-speed, clutch, first-class order, for Scott, cash adjustment either way.—Dr. Sewell, Horwich, Lancs. [1437]  
 1914 3½h.p. New Hudson, 3-speed, clutch, perfect condition, brand new tyres; 236; privately owned.—Seen at Scott's Garage, Shrewton, Wilts. [1400]  
 NEW Hudson, late 1913, 3½h.p., 3-speed, clutch, coach sidecar, handle start, new tyres, good running order, runs on paraffin; bargain, 230.—5, Deacon Crescent, Maltby, near Rotherham. [X8706]

## New Imperial.

CROW Bros., Guildford.—New Imperial, latest 2½h.p., 3½h.p., 6h.p. models in stock; also sound second-hands. [1047]  
 1915 New Imperial-Jap, 2½h.p., 2 speeds; 225.—Parradine, Hunts Farm, Margeret Roding, near Dunmow, Essex. [1442]  
 BRAND New 1917 2-speed New Imperial Lightweight; 39 gns.; exchange considered.—Motor Exchange, Horton St., Halifax. [1416]  
 1917 New Imperial-Jap, absolutely equal to new; 32 gns. 7/10, 84, Broad St., Reading. Phone: 1024. Closed Wednesdays 1 o'clock. [0930a]  
 1916 2½h.p. 2-speed New Imperial-Jap, lamps, mirror, mechanical horn, speedometer, good as new; 227.—Advertiser, 9, Osborne St., Barrow-in-Furness. [X8663]  
 IMPERIAL-J.A.P., 1915-16, 2½h.p., 2-speed, rebushed throughout, equal to new; selling because of petrol restrictions; seen any time; 225.—Barclay, 7, Greville Place, Kilburn, N.W. [1474]  
 NEW Imperial, late 1915, 2½h.p., 2-speed, Bosch, variable ignition, lamps, horn, etc., good condition, little used; 225, or nearest offer.—R. C. Watterton, 43, S.C. Rd., Portobello, Dublin. [X8781]  
 REAL War Bargain.—New Imperial-Jap, 2½h.p., 1916 model, 2-speed countershaft, been used very little, in first-class condition, complete with lamps, etc.; accept 225 for quick sale.—Brown, 11, Higher Albert St., Chesterfield. [X8767]  
 NEW Imperial 8h.p. J.A.P. Overseas War Office combinations, as described in detail pages 252-3, Sep. 13th issue of this paper, exceptional machine in every detail; immediate delivery from stock; 2114/9.—Colmore Depot, Distributors, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886]  
 1917 New Imperial-Jap, 2½h.p., 2-speed model, guaranteed mileage under 1,000, Best and Lloyd lubricator, X1 all saddle, adjustable footboards, new spare belt and chain, tools, etc., condition absolutely as new; expert examination invited; 235, no offers.—23, Culliford Rd., Dorchester, Dorset. [X8695]

## Norton.

NORTON, 1914 engine, (in perfect order) in 1912 frame (needs overhauling); 220, or near offer.—Wilson, Clare Lodge, Market Rasen. [1424]  
 SPECIAL Brooklands Nortons, 3 only, brand new War Office models, no permits required; 282/10; first choice secures.—Percy and Co., 337, Euston Rd., London. [1557]  
 FOR Sale, Norton, 3½h.p., perfect condition; 225, or exchange lightweight, Douglas preferred; Grind Multi pulley, fit 5-6h.p. machine, cost 24/4, accept 22/10, nearly new.—J. Salway, Shepton Beauchamp, Ilminster, Somerset. [1402]

## N.U.T.

NUT-J.A.P., 2½h.p., o.h.v., 3-speed, 1915 T.T. Model, perfect condition, little used; bargain, 242; seen by appointment.—10, Crescent Rd., Southport. [X8735]

## O.K.

O.K. Juniors.—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn. [0910]  
 1915½ O.K., 2h.p., 2-speed, 4-stroke, only run 2,000 miles, splendid condition, fitted to and runs on paraffin, insured for six months, lamps, horn, and tools complete; 228, or near offer.—T. Knox, Peuffillan House, Sandycroft Rd., Folkestone. [X8769]

## P. and M.

P. and M. 2-speed Combination, 1911, little used; 225.—Particulars, 41, Ashford Rd., Cricklewood, N.153  
 P. and M., 1914, 3½h.p., coach sidecar, wind screen, splendid condition throughout; 243.—Drakes, Falkland, Fifehire. [X8694]



## MOTOR CYCLES FOR SALE.

## Portland.

1913 Portland Combination, 7-9h.p. Peugeot engine, 2 speeds, perfect condition, lamps, spare belt and tube, seldom used during war; £34.—Sgt. Aldred, 10, Mayflower Rd., Clapham. [1508]

## Premier.

PREMIER 1915 Combination, 3-speed countershaft, new condition, tyres, etc.; 40 gns.—280, Chamberwell Rd., S.E.5. [1398]

1913 Premier, countershaft gear, chain-cam-belt, F.E., lamp, accessories; bargain, £23, nearest.—Box L5,101, c/o The Motor Cycle. [1550]

## Radco.

RADCO, 1917, 2½h.p., 2-stroke, ns new; £25; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C. [X8786]

## Rex.

REX, 4h.p., 3-speed, clutch, handle start, sidcar, lamps, horn, etc., very good running order and condition.—Endes, Birdwell, Barnsley. [X8670]

REX 6h.p. 3-speed Countershaft Coach Combination, all chain drive, full equipment, electric light, perfect condition; £50.—25, Annesley Av., Hendon, N.W.9. [1522]

## Roc.

ROC, 3h.p. Antoine engine, Bosch, B. and B., free engine; £14/10.—14, Sedgemere Av., East Finchley, N.2. [1391]

## Rover.

ROVER, latest countershaft model in stock; £77.—Marston, 31, Bridge St., Chester. [X8752]

ROVER T.T., equal to new; 55 gns.; 1917 model, 4 Julians, 84, Broad St., Reading. Phone: 1024. [8929]

1916 Rover, 3½h.p., 3-speed, kick starter, perfect condition; 52 gns.—Julians, 84, Broad St., Reading. Phone: 1024. Closed Wednesdays 1 o'clock. [X932]

ROVER, 1914-15, T.T., 3½h.p., enamel as new, 28 gns.; 1913 clutch model Rover, 24 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead, (D). [1539]

ROVER, 1917, 3½h.p., 3-speed, kick starter, clutch, semi T.T. bars, recently cost nearly £85, only 60 gns.—Julians, 84, Broad St., Reading. Phone: 1024. Closed Wednesdays 1 o'clock. [X930]

ROVER, 3½h.p., late 1916, 3-speed countershaft, kick starter, head lamp, generator, rear lamp, very nice mount, perfect throughout; £55.—Mebes and Mebes, 156, Gt. Portland St., W.1. [8538]

ROVER 3½h.p. Motor Cycle and coachbuilt sidcar, 3-speed, lamps, horn, speedometer, 2 spare inner tubes, spare belt, and all accessories, in perfect condition; £40.—Apply, 11, Westbrook Rd., Thornton Heath. [1238]

ROVER, 3½h.p., 1917, 3-speed countershaft, kick starter, and Turner coachbuilt sidcar, all in new condition, only run about 500 miles; cost 88 gns. last July, accept 70 gns.—Barksfield, Station Parade, Gerrard's Cross. [1404]

## Royal Ruby.

ROYAL Ruby, latest 2½h.p. countershaft model in stock; £46.—Marston, 31, Bridge St., Chester. [X8753]

## Rudge.

RUDGE Multi, 1917, 3½h.p., olive green tank, as new; 48 gns.—Below. [1499]

RUDGE Multi, 1913, combination, in very fine order, small mileage; 37 gns.—Below. [1499]

RUDGE Multi, 1914, T.T., wide tank, sporting and fast machine; 32 gns.—Below. [1499]

RUDGE Multi, 1913, overhauled and renovated, 27 gns.; Rudge, 1913, T.T., clutch, 23 gns.; Rudge, 1912, 3½h.p., 2-speed combination, 23 gns.; solo, 19 gns.; Rudge, 1912, clutch model, 17 gns.; Rudge Multi parts and valves in stock.—Rider Troward and Co., 31 and 78, High St., Hampstead, (D). [1367]

RUDGE Multi, 1914, h.b.c., clutch, Watford speedometer; 25 gns.—Thompson, 20, Tudor Gardens, White Hart Lane, Barnes. [1504]

RUDGE Multi, 1914, 5-6h.p., Golby sidcar; seen Endes, 405, Holloway Rd., N., or letters Randall, 96, Dovercourt Rd., S.E.22. [1460]

RUDGE, 1917, 3½h.p., mag., Multi gear, lamps, new; 48 gns.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [1499]

RUDGE Multi, 1913, fine condition, fast and comfortable, semi T.T., ready for road; £28.—Gravenor, Fir Grove Hill, Farnham, Surrey. [X8734]

RUDGE Multi, 1914, 3½h.p., splendid condition, coach sidcar, kick starter, speedometer, hand clutch, etc.; bargain, £32/10.—26, Colson Rd., East Croydon. [X8689]

RUDGE Multi, late 1913, and sidcar, good condition, lamps, horn £30, or near.—Seen at Clarence Motor Works, 20a, Newington Green, Mildmay Park, N. Private owner. [X8668]

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MATCHLESS (2) 8 h.p. Comb., 3-speed £120 0  
NEW HUDSON, 4 h.p., 3-sp., de luxe Sc. £84 18  
JAMES, 1918, 5-6 h.p. twin, the latest £84 0  
ROVER, 5-6 h.p. Comb., £124 5s.; solo £97 10  
ROVER, 1917, 3½ h.p., 3-sp. Comb., Sc. £99 4/6  
ROVER, 1916, 3½ h.p. solo, lamps, horn £68 10  
LEVIS Popular Model ..... £32 0  
CALTHORPE-J.A.P., 1917, 2½ h.p., 2-sp £39 10  
ALLDAYS ALLON from ..... £37 10  
ROYAL RUBY, 2-str., £32; J.A.P. 2-sp £46 0

## SECOND-HAND MACHINES.

ENFIELD (5), from ..... £68 10s. to £115  
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H.-DAVIDSON, 1915, elec. mod., S-car £75 0  
H.-DAVIDSON, C Sc., hood, screen £22 10  
SINGER, 1913, 4½ h.p., 2-sp., c/sft., solo £29 10  
ARIEL, 1915-16, 3½ h.p., c/sft., k-st. £72 10  
TORPEDO-PRECISION, 2½ h.p., h-cl. £72 0  
JAMES, 1916, No. 6 Comb., lamps, horn £73 0  
JAMES, 1913, 4½ h.p., solo, with access. £22 10  
LEVIS Popular, 1916, sound, with ac. £25 10  
INDIAN, 7-9 h.p., 1915 cl. mod., lamp £55 0  
INDIAN Powerplus, 1916, 7-9 h.p. Comb £73 10  
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## MOTOR CYCLES FOR SALE.

## Rudge.

RUDGE Multi (solo), 1914, belt driven, Multi gear 3½h.p., electric front and back light and horn, first-class condition; £32.—Day, 1, Minford Gardens, West Kensington, W.14. [1339]

FIRST-CLASS 3½h.p. Rudge Motor Cycle, clutch model, complete with lamps, tools, and horn, in whole machine, including tyres and belt, is in first-class condition; price £26, a genuine war bargain.—C. Bink Ltd., Carburettor Manufacturers, Eccles. [X829]

## Singer.

SINGER, 3½h.p., 3-speed combination, fully equipped 35 gns.—245, Hammersmith Rd. W. [141]

## Scott.

1915 Scott, complete lamps, horn, etc.; £40.—Cree Jeweller, Rotherham. [X874]

3½h.p. Scott, Montgomery sidcar, first-class condition 35 gns.—245, Hammersmith Rd., London. [1346]

WAR Bargain.—Scott, 1913-14, 3½h.p., 2-speed, belt start, Scott carburettor, tyres good, in fine condition, recently overhauled, enamelled and plated, makers at a cost of 10 gns.; price 46 gns.—N. Godwin Heath, near Chesterfield. [X872]

## Sparkbrook.

SPARKBROOK, 1917, 2-speed, 2-stroke, as new; 11 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead, (D). [154]

SPARKBROOK 6h.p. J.A.P. Combination, new October, 1916, little used, 2 spare tyres, P. and L. lamps, Klaxon horn, Cowes speedometer, all surplus required, also 12 gallons petrol; a splendid investment 70 gns., or near offer.—Clarence Cory, Gosport. [138]

## Sun.

1914 2½h.p. Sun-Villiers, 2-stroke, good condition 11 gns.—Asquith, 112, Gloucester St., Salt P. Manchester. [X876]

SUN-J.A.P. 1916, 8h.p., 3-speed Sturmer countershaft coach sidcar, many accessories, fully guaranteed cost £110. 78 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead, (D). [133]

## Sunbeam.

SUNBEAM Combination, 8h.p. M.A.G., almost new £110. [150]

SUNBEAM Combination, War Office model, as new £105.—Percy and Co., 337, Euston Rd., London. [150]

SERVICE Model 3½h.p. Sunbeam, new July, 1911, done only 3,000 miles, in perfect order; owner requires more power; 80 gns.—Dr. Boyd, Fenton, Staff. [X870]

WE have two 8h.p. Sunbeam Combinations in stock, fully equipped, and in perfect condition throughout.—Elce and Co., 15-16, Bishopsgate Av., Cannon St., E.C.3. [105]

SUNBEAM, 3½h.p., late 1914, in splendid condition with nearly new Sunbeam sidcar, both very little used, and well cared for, 3 lamps, horn, etc.; £65. Combs, Coldharbour, Sherborne. [X864]

3½h.p. and 8h.p. Sunbeams, latest 1917 model, absolutely new, immediate delivery again priority permits for doctors, farmers, war and munition workers.—How and where to apply, for full particulars, Robinson's Garage, Green St., Cambridge. [144]

## T.D.C.

T.D.C. 2½h.p. Model de Luxe, late 1916, little used 16 gns.—77, Acre Lane, S.W.2. [141]

ABSOLUTE Bargain.—2½h.p. T.D.C. De Luxe, 2-stroke, complete, late 1914; first £14 secured; may be sold instantly.—Sergt. Wells, 3, Grantley Terrace, Sydenham Rd., Guildford. [X860]

## Triumph.

TRIUMPH, 1911, 3½h.p., Philipson pulley; sp. price £16/16.—Motor Exchange, Horton St., H. fax. [141]

TRIUMPH, 2-stroke model, 2-speed gear, Lucas lamp waterproof Bosch, had little use; £35.—Potts Stowe, Lichfield. [X874]

COUNTERSHAFT Triumph, perfect order, 69 gns. with coach sidcar 79 gns.; complete with all accessories.—Below. [1499]

TRIUMPH, 1914, 3-speed, clutch, kick start, and shing coachbuilt sidcar, complete with lamp, horn, tools; three of the above in stock, 43, 45, and 46 gns.; 1914 Triumph, 4h.p., 3-speed, solo, 37 gns.; 1913 Triumph, 3-speed, coach sidcar, 37 gns.; 1913 Triumph, 2-speed, with sidcar, 29 gns.; 1913 T.T. Triumph, 1 gns.; 1911 standard Triumph, 17 gns.; all the above have been overhauled, and are guaranteed for 12 months. They are complete with head and tail lamp, horn, tools, and pump.—Rider Troward and Co., 31 and 78, High St., Hampstead, (D). [131]

3½h.p. Triumph, 1911, and coachbuilt sidcar, 2-stroke F.E., recently overhauled, first-class condition, £25 cash; write for appointment.—Luckins, 17, O. Queen St., S.W. [151]

1912 3½h.p. Clutch Model Triumph, 2-speed N.B. gear, and Phoenix coachbuilt sidcar; £30; fully equipped, fitted for substitute.—Lieut. Reynolds, Co. house Fort, E. Tilbury, Essex. [141]



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## Petrol for Education.

THERE recently appeared in *The Times* two articles, one entitled "The Duty of Saving Petrol—Economy to 'the last drop'"—which was a special appeal by Professor Cadman, the Director of the Petroleum Executive, and the other the report of Sir Auckland Geddes's speech at Nottingham, in which he pointed out the urgent need of women to act as motor drivers or mechanics, and women with technical experience to join the Flying Corps.

Now, dealing with the first, Professor Cadman's appeal for economy in petrol, though couched in moderate terms, is none the less urgent. He points out that "there does exist a very serious shortage," and goes on to say that, "although steps are being taken to supplement the supplies, it is the duty of every citizen of the State . . . to economise to the last drop. It must be clear to everyone that as modern methods of war develop more petroleum products—petrol, kerosene, lubricating oil, fuel oil, etc.—are required." This is, of course, perfectly obvious, and it is now more clear than ever that petrol should not be used unnecessarily. We doubt, however, if those responsible for the import of, supplies of, and use of petrol fully realise what the motor cycle has done and is doing for the country. They realise doubtless that the young pre-war motor cyclist is now doing his duty as a despatch rider, and they think perhaps that there are enough despatch riders at present—when more are needed they can be easily found. But we are quite certain that they are not alive to the fact that the stock of Class A motor cyclists is not inexhaustible. As we have pointed out on a previous occasion, the healthy skilful motor bicycle rider makes a first-class pilot; more than that, he makes the best car driver—the attention he gives to his machine renders him a good mechanic, so that with or without his mount he can be of inestimable service to the nation. The young motor cyclist

now at a Public School who has had to lay up his machine for want of petrol is a loss to his country. All the experience which he should now be getting, the mechanical knowledge, dexterity in handling, the training of the eye and nerve, are now beyond his reach. It is fairly safe to assume that when the time comes for him to join a technical branch of one of the Services, his training will occupy much longer than if he had obtained the chance of pursuing his favourite bent even in the strictest moderation.

Turn now to Sir Auckland Geddes's appeal. He asks for women drivers, driver mechanics, and women with technical experience. We happen to be pretty closely in touch with candidates for such branches of National service, and we know that all the time the demand is for women who have had experience. Before the petrol regulations became so strict women motor cyclists were on the increase. It is practically certain that nearly all are now employed in serving their country in some way or another; so where are the women with motoring experience to come from? Of course, if the shortage of petrol is so serious as Professor Cadman states, there can be no petrol for educational purposes other than that allowed to recognised motor schools, and there is no more to be said, but the school taught candidate is of little practical use at the end of his course. He is full of theory and empty of experience, while the owner-driver of a car or motor cycle is of real value, as he is the finished article and ready to take up a definite post. There are practically no schools for motor cyclists, and those fit to take up national work have taught themselves at their own expense in the hard school of experience. If the demand for air pilots, transport drivers, and other branches of the army which demand a knowledge of petrol engines is to be met, then the Government must institute its own schools or it must organise necessary motoring in such a way that the boy soldier of to-morrow derives some benefit from the limited supply.

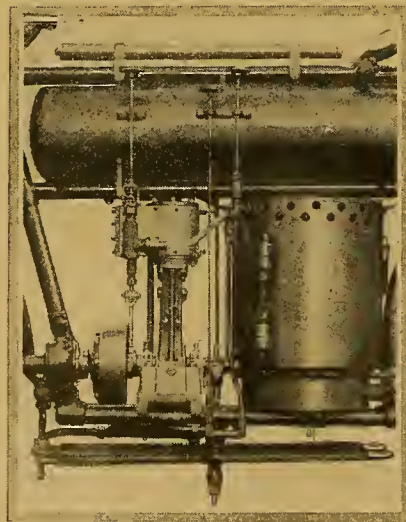


# A STEAM MOTOR CYCLE.

A Very Interesting Experiment on a Much-discussed Topic.

FROM time to time many of our readers have shown considerable interest in the possibilities and design of a steam motor cycle. There is no doubt that a steam motor cycle has possibilities, but it is equally certain that up to the present time no such thing as a satisfactory steam motor cycle has been put on the road. In our contemporary *The Model Engineer and Electrician*, dated November 1st, an extremely interesting attempt at making a satisfactory steam motor cycle is described, and the illustrations will show that when the machine was completed its appearance was anything but displeasing, and could not by any stretch of imagination be called freakish. Unfortunately, the designer himself is compelled to admit that the experiment was not an unqualified success, and owing to various minor faults the machine did not give the same satisfaction one expects and obtains from the ordinary petrol motor

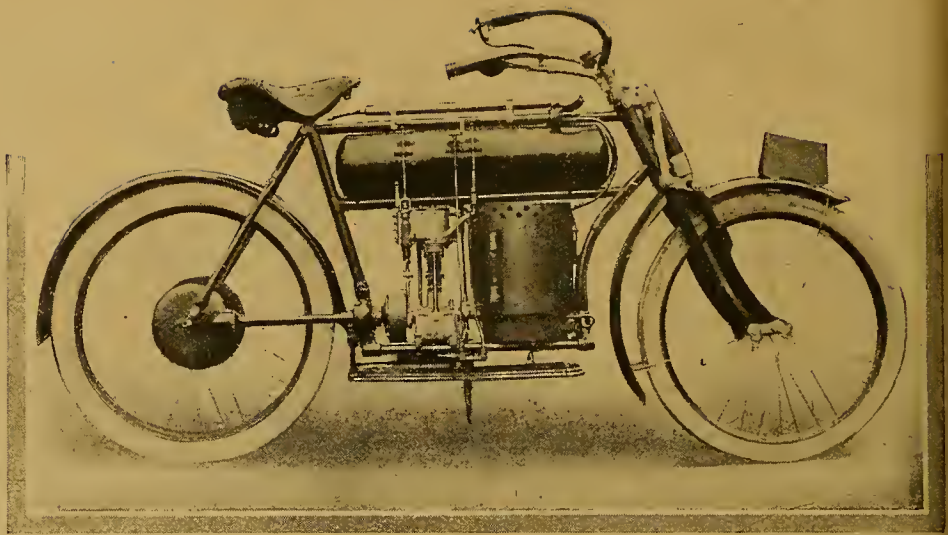
cycle. Our criticisms of this machine are perhaps rather superfluous in view of those given by the maker and designer, but we must confess that we should feel rather attracted by the proposition if only the mechanism of the engine itself were enclosed instead of being so exposed to dirt. The description following is in the designer's own words:



Details of the double-acting single-cylinder engine. It has a 2in. bore and 2½in. stroke.

"The frame was originally an F.N. with enclosed bevel drive slightly altered, giving the necessary room for boiler and engine to be mounted in line.

"The boiler is of the multi-tubular type, 9in. diameter by 12in. high, having 120 ½in. copper



An old F.N., having a steam power plant incorporated in place of the petrol engine.

tubes, carrying a working pressure of 500 lb. A seamless steel was used for its construction with screwed-in ends electrically welded.

"The burner, of simple type with pilot, was arranged for paraffin fuel.

"The engine is of the single-cylinder, double-acting type of 2in. bore and 2½in. stroke, direct coupled to the back tailshaft, having a reduction gear of 6½ to 1.

"The circular tank, divided into two parts, contains fuel and water, the fuel being fed under pressure to the burner.

"The boiler feed is pumped through two water heaters, first through an exhaust steam heater, and afterwards through a coil placed in the fire-box. Superheated steam is used, having the superheater again in the fire-box.

"The exhaust is condensed as much as possible by a surface condenser, the hot water being returned to the boiler, the uncondensed steam escaping.

"The machine on trial would steam steadily at 25 m.p.h.; a higher speed could be enjoyed for short spurts.

"Several points make this cycle unsatisfactory, apart from the excessive weight, trouble with the burner in a high wind, exhaust steam, small water-carrying capacity, and the wastefulness of the single-expansion engine in steam at this high pressure. The rise in steam pressure on a sudden stop did not make one feel at all at ease in the saddle."

The National Motor Cyclist Fuel Union, the first meeting of which was reported in our last week's issue, is entirely in sympathy with the prohibition of petrol for pleasure motoring, but feels that the allocation of an amount of petrol would enable its members to devote more time to the production of essential munitions. It is to be remarked that the quantity of petrol required would be infinitesimal, amounting to one-eighth of one cargo per annum. The secretary is Mr. W. Ellis, 70, Abingdon Street, Derby, to whom prospective members should apply.





### About Speed Gears.

**R**OAD Rider" tells me I have converted a leading designer to the necessity of feather-weight two-speed gears for baby machines after the war, and that suitable gears will be ready in a very high quality. Another designer ventures the opinion that the four-speed gear will presently oust the three-speed, because the four-speed box eliminates so much slow hill-climbing, and reduces the time taken over a journey so appreciably. I am not so sanguine on this point, and will reserve my opinion until I have tried four-speed boxes with a great variety of engines. My A.B.C., speaking from memory, is geared at  $4\frac{1}{2}$ ,  $5\frac{1}{2}$ ,  $9\frac{1}{2}$ , and  $11\frac{1}{2}$ . Its engine is more of a revver than a gear-puller, but it does not really need all four ratios. Bottom gear, for example, is never used; it might conceivably come in handily in an A.C.U. precipice crawl or in sidecar work, but it is not wanted on sane roads. Nor are both fourth and third gears really necessary. Fourth is too high for a revving engine, though it certainly enables me to get a few extra m.p.h. in a scrap. But for all ordinary work I should be perfectly satisfied with two gears of, say, 5 and 9, and the machine is not more efficient in ordinary work by reason of its four-speed box. I can get 45 m.p.h. on the second gear, and 55 m.p.h. on the third. Fourth and first might as well not be there, except on the rarest occasions. I won't go so far as to say there are no engines which will not be improved by a four-speed box. For instance, a bad engine that will not rev can do with them; and if my A.B.C. engine belonged to a man who rode in freak hill-climbs and took a sidecar round the Scottish Trials, and had an engine that could pull a gear as magnificently as it can rev, an average year's work would find plenty for each of the four ratios to do. But, considering the uses to which I put it, and the quality of the engine, it reminds me of a man with four cigarette cases.

### Why Gear Boxes Fail.

**I** ALLUDED some weeks ago to the frequency of gear box troubles in the years immediately preceding the war. I have been going into the causes pretty carefully, and am more inclined to ascribe the troubles to bad design than to rough usage. The three following defects seem to have been regular culprits:

(a) Weak housing of the bearings in the casing. This may indicate that the mounting of the gear box does not permit of permanent alignment, and the housings may have worked loose as the result of cross strains. It may mean that the housing itself is too shoddily done to resist strains that are inevitable. It may mean that lubrication is imperfectly carried out. All three causes probably share responsibility.

(b) Inadequate lubrication. Manufacturers always seize gleefully upon any signs of seizure as a whip

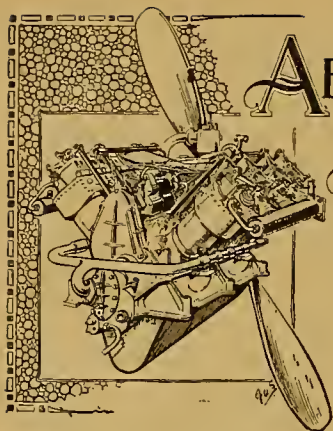
wherewith to belabour the user. But I have encountered numerous cases where the user had employed a suitable oil in the recommended doses and yet had struck serious seizures. In some cases the provision for maintaining oil feed to all the bearings was grossly inadequate. In others the gear box did not contain sufficient oil when filled. A long run thinned the oil down to the danger point, and eventually in a rush up hill a bearing seized.

(c) Bad design of the gear box in basic principles. A three-speed gear box may be so designed that the layshaft is geared up or down on top gear. If it is geared up the r.p.m. of the respective parts will be, approximately: Main axle, 1,000; layshaft, 2,000. If the layshaft is geared down on top the speeds will be: Main axle, 1,000; layshaft, 500. The former construction is the commoner, and, obviously, does not make for durability nor ease the problem of adequate lubrication.

### A Defect of the Super-single.

**A** CORRESPONDENT asks me to initiate a discussion about the respective stamina of the flat twins and the high efficiency single-cylinder, with particular reference to the carbonisation period. He has been specially interested in the controversies of the past year, as he happens to own leading samples of both types. As one might expect, his single is emphatically the better top gear climber when clean, thanks to its 22 lb. flywheel. It is also 3 m.p.h. faster than his flat twin (of the same c.c.). On the other hand, it is naturally uncomfortable by comparison, as it has a rigid frame, and it is not a "go-anywhere" machine, as the Philipson pulley does not afford a low enough gear for real hills. So much for the contrast between the two types when they are new. Now comes the kernel of his analysis. His flat twin will run up to 8,000 miles without decarbonising, but the single-cylinder begins to pink rather badly after 500 miles, and also to lose a good percentage of its speed and climbing abilities, so that he invariably decarbonises it after 600 miles. On the above report I have two remarks to make. The first is that correspondents in this discussion are for ever comparing full touring flat twin machines equipped with three or four-speed gear boxes, etc., and stripped road-racing singles. If they would awake from this charming oblivion and contrast the tourist flat twin with the tourist single-cylinder this vantage of what aero experts call "performance" would weigh far more heavily in favour of the flat twin. My second comment is that 8,000 miles without decarbonisation sounds a trifle steep. I cannot give exact figures, as much of my flat twin work has been accomplished with the speedometer out of action. I claim a vantage on this score for the up-to-date flat twin; whereas I always decarbonise a 500 c.c. single-cylinder after 1,000 miles at the latest, I let my flat twin mounts run 3,000 miles before I clean them. But 8,000—!





# ABOUT AERO ENGINES



## No. 1.—INTRODUCTORY.

Many of our readers are probably ignorant of the special features that distinguish aero engines from motor cycle and motor car engines. Samples of the leading types of aero engine will be briefly described in a series of articles, the first instalment of which we print below.

**C**ERTAIN features distinguish all aero engines from road engines. These must be outlined before we proceed to give an account of the working of individual types. First of all, cost is of no account where aero engines are concerned—at least in war time. Experimental engines may cost £10,000 apiece. The responsible Government is ready to face such expense if the engine promises to be good. When an engine is passed for production in quantity its cost naturally decreases. Thus, the seven combustion heads of a sample rotary engine may cost £30 apiece, but when the engine begins to come through the factory in hundreds the cost per head may drop to 30s. Generally speaking, a rotary engine produced in series will cost at least £400; a huge V or "broad arrow" (three-row V) may very possibly cost £4,000. The supreme aim is efficiency, and to secure it neither material nor labour is stinted.

Secondly, the aero engine is a slow speed engine compared with the road engine. Many modern road engines can exceed 3,000 r.p.m. No existing aero engine exceeds 2,000 r.p.m., and unless the propellers are geared down, 1,300-1,400 r.p.m. is about the normal maximum. They are designed to produce their power at a low rate of revolution, largely because high speed propellers are at present beyond our reach, and will probably remain so.

Thirdly, the aero engine is designed to run all out all the time—full throttle is its daily food. Flexibility is almost ignored in its make-up. Pilots prefer engines which do not demand that half a dozen mechanics should hold the aeroplane when the throttle is closed; but there are aero engines which have a minimum speed of 800 r.p.m. and a maximum speed of 1,400 r.p.m. This is an extreme example, but it indicates that flexibility is not essential.

### High Power and Low Weight.

Fourthly, aero engines are necessarily super-efficient as a class. They out-Brooklands the best track engines. This point, of course, is due to weight considerations. Whether an aeroplane is required for reconnaissance, for "artobs" (artillery observation), for bombing, or for fighting, the lighter it is the better. If it is, comparatively speaking, of the non-combatant type, it must be able to get its height quickly; if it is a fighter, "performance" means everything. "Performance" includes horizontal speed, rate of climb, rate of dive, useful load, fuel and oil consumption, and the heart and core of performance, so far as the engine is concerned, is a huge power output

from a lightweight engine. Consequently, aviation has no use for the big woolly type engine once so common on American cars. The maximum horsepower must be squeezed out of the minimum weight of metal, and the outlines of the engine must be shaped to reduce wind resistance. Further, it is vital to concentrate the weight in as compact a mass as possible. If an aeroplane were fitted with an engine possessing eighteen vertical cylinders in a straight line, that aeroplane would be very slow on its controls and would never make a fighter. Roughly, the centre of gravity is the pivot on which the machine twists and curvets and soars and dives; and if one can concentrate the heavy mass of the engine in a compact little lump the machine will out-manceuvre one which has a lengthy engine, just as a T.T. bicycle will leave a Rolls-Royce standing round a hairpin bend in a narrow lane.

### Aero Influence on Car Engines.

For these and other reasons the average aero engine is of the super-Brooklands type. To put the point vividly, there is a certain British motor car manufacturer, who in the pre-war days produced an excellent car, capable of 60 m.p.h. on its fourth gear. After the war began, its designer became interested in aero engines. His 1917 experimental model can do 75 m.p.h. on its third gear, and that without any sacrifice of flexibility or refinement. If he could afford to ignore silence and elasticity he could probably make it do 100 m.p.h. on its third gear.

Fifthly, an aero engine must be extremely light. Every conceivable ounce must be pared away from every part. The designer contrives to extract a record horse-power from the cylinder capacity which he has adopted; and simultaneously he works on and on till he has cut down the weight per h.p. to figures never dreamt of in the old days. He effects this in various ways. He eliminates every part that can be eliminated. He makes one part do the work of three, even when such combinations make the engine awkward to dismantle or reassemble. He machines parts which used to be cast, so that no extraneous metal may creep in through the inaccuracies of foundry work. He employs a light piece of expensive high-grade steel in lieu of a heavy piece of inferior steel. He uses aluminium alloys where lumps of iron or steel once figured, and so on. Every ounce that he saves means that the aeroplane can climb quicker, fly faster, carry more machine gun rounds, more bombs, or more fuel. The only thing he loses in lightening his engine



**About Aero Engines.—**

is the power to dive fast. Broadly speaking, our engines are so far superior to the Hun engines in this way that, whereas a German machine that wishes to refuse battle will usually dive, a British plane that has jammed its gun will sometimes climb away from its foes.

**The Cooling Problem.**

The last point to be handled in this elementary introduction is cooling, and here the aero engine designer is up against some problem, because in summer time and at medium altitudes his engine will be in some danger of being undercooled. It is perpetually working on full throttle, and is possibly air-cooled. The head draughts produced by flying speeds of much over 100 m.p.h. are not so helpful as a motor cyclist might suppose. They play on one side of the engine only, and so tend towards cylinder distortion—in fact, the front of the engine is very

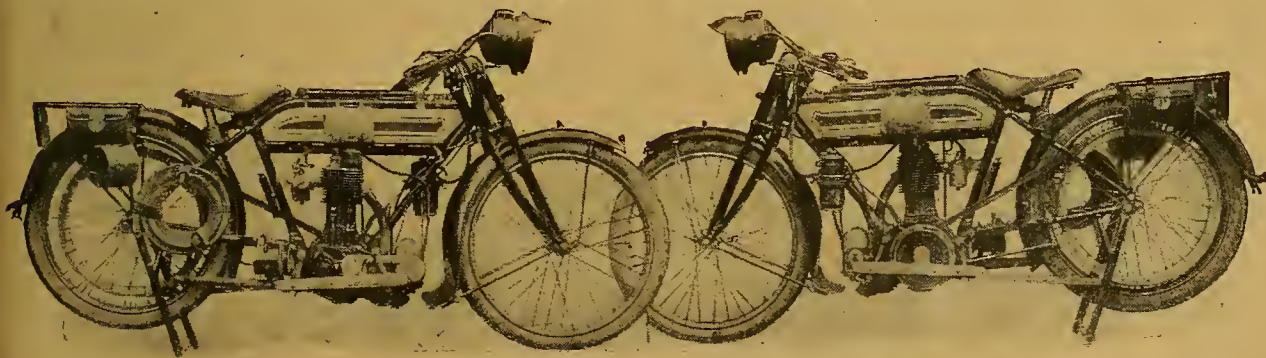
possibly "cowled," or covered in, partly to equalise the cooling and so reduce distortion, partly to offer a smooth surface to the wind resistance, possibly to armour the nose of the machine against machine gun fire. In winter, and up towards the "ceiling," or maximum altitude attainable by the machine, the peril of over-cooling becomes frightfully real—the oil cooler may freeze, the carburettors may freeze, the temperature of the engine will sink below the figure demanded for efficient working. All these problems have to be solved. As a result, our designers have doubled and trebled their comprehension of engine cooling. We used to say that thermo-syphon cooling was inefficient. We know now that the cylinder design was faulty whenever thermo cooling was a partial failure. We used to think that water-cooling was essential for cylinders above a certain size. We hope now that air-cooling may ultimately become standard on all small and medium car engines.

## A Triumph with Outside Flywheel.

THE following details describe rather unusual alterations made to a 1914 Triumph, the most novel of which is the fitting of an outside flywheel. In addition, an adjustable 1917 type back forks and brake, B.S.A. footboards and carburetter, a low compression valve cap with copper cooling fins, and a 1917 type tank have replaced other standard fittings of 1914. The owner, a lieutenant in the R.E.'s,

speaks highly of the low compression device and the outside flywheel, and says he finds it an ideal machine for single gear riding, being extremely flexible with a good turn of speed, and he has had no cause to regret the time spent in the alterations.

Since the photograph was taken the owner has discarded the Rudge front forks and replaced them with a pair of the original make.



A 1914 Triumph which has undergone the transformation described. An outside flywheel has been fitted and other detail alterations made.

## Lubricating Systems.

IT is to be observed that slowly but surely the visible drip feed is proving a washout. Several of our most practical engineers, including the makers of the Triumph and the A.J.S., have already abandoned it and substituted a plain hand pump with spring-loaded plunger and a simple two-way tap. The chief reason for this return to old-time simplicity is that it has been found that the cooling douse of oil every four or five miles has a very beneficial effect, and because the visible drip is an impossible instrument to adjust and readjust at the desired rate of flow.

It is rather painful, however, to reflect that, while American systems of lubricating have advanced, and leave little to be desired, we have taken a step back! If we are to return to the old system, let us at any

rate adopt the Triumph arrangement with its minimum of fittings and oil leaking joints, though it is earnestly to be hoped that in the near future the hand pump will be regarded merely as an auxiliary to the mechanical pump, operated by the engine. What we really want is mechanical oil feed with visible, throttle-controlled drips situated on the tank, then an auxiliary hand pump to assist.

By this means the hand pump can be called into commission on cold mornings or on sudden emergencies, or the mechanical pump can be set always to give an insufficient feed, a charge being given by hand every ten miles or so. The scheme suggests various alternative systems—a sufficient range to meet the tastes of all. —





## OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

**Colonials and the Air.** ALL over the British Empire that type of youth whose sporting tendencies made him a valuable member of the motor

cycling community to which he belonged was among the first to lay aside all personal interests and comforts to throw in his lot with the cream of the world's manhood that first flocked to the Colours. Veritable giants the majority of our Colonial troops were, and very soon they had established for themselves a unique reputation. Sons of the free, they were never very remarkable for any particular virtues in the way of discipline, and the majority embarked on this great adventure with the typical lightheartedness of the pioneer, by whom peril is forgotten and wiped out immediately it is past. "Laugh, fight, and die," was their appropriate motto, and the stories of gallantry and humour that might be written about them would fill volumes.

During the last few months we have come in contact with many Colonial motor cyclists here on leave, chiefly Australians, but quite a few Canadians. The majority of these men have seen a good deal of hard fighting in infantry units, but, true to the old sport, their interests are still centred on things mechanical, and it is noticeable that a very large number of Overseas motor cyclists are now serving or undergoing training as R.F.C. pilots, and are unquestionably of the right type for that independent and somewhat hazardous calling.

More pilots and yet more are needed, and this potential field is one fully worth exploring. The Overseas motor cyclist is usually a highly practical individual, possessing confidence in his own resources, not only as regards his machine, but in the affairs of life in general. That cool independence of character notable in the frontiersman, that forgetfulness of danger immediately it is past, and readiness to participate again in the same perilous undertaking, are

the very traits so highly desirable in an aerial pilot, so typical of the type of men who distinguished themselves at Gallipoli, Loos, and Vimy Ridge. If, in addition to these characteristics, he has a true love for the handling of machinery and a rudimentary knowledge of machines in general, our ideal pilot is at hand.

**American Machines.**

DURING the past month we have dealt with various American machines for 1918, and reviewing these one is impressed by the fact that, though the best American productions are good in many important respects, the detail design is generally of a nature which simply would not be tolerated by any British factory of repute.

One is overwhelmed by the confusion of rods and bell-crank levers, cantilevers and hinges operating the clutch and gear box, and the sensations of the tyro gazing upon this chaos of disorder can well be imagined.

But though the methods of application are generally crude and ugly, the ideas carried into effect are good. The duplicate clutch control is an excellent system, as also is that of so connecting up the clutch lever that a continuation of the declutching movement brings the foot brake into operation, the brake normally being independent. By this means a sidecar outfit can safely be left standing on a gradient, while the single lever control in traffic riding must be a great convenience. These petty refinements can be—and have been—arrived at without the use of levers resembling

crowbars and countless twiddly bits operating round corners.

The twist grip control renders possible a clean handle-bar, and is doubtless the simplest method, though it is far from being an unmixed blessing. One twist grip, operating the magneto contact breaker (and possibly the exhaust valve, though the Hendee people



CALIFORNIAN SCENERY.

Overlooking the San Fernando Valley, Los Angeles. There are some good roads, as roads go in Western America, in this district, and motor cycling is fast becoming popular, the machines in the district being usually big twins.



# ARIEL

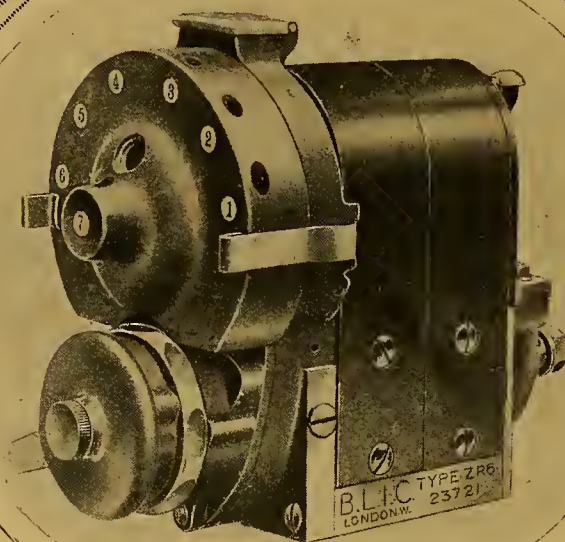


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## Overseas Section.

have now abandoned this), is a system to be commended, but we certainly think that the carburetter should be controlled as hitherto. Very little nicety of adjustment is permitted with the twist grip. For the magneto this does not matter, for three positions only need be recognised—fully retarded, fully advanced, and midway. With the carburetter, on the other hand, one recognises various lever settings as the best for economy and general good effect, and, as one of our contributors has already pointed out, the twist grip carburetter control is the finest inducement for bad driving yet conceived.

The American kick-starters are generally crude and none too dependable, seeming to indicate, in the majority of cases, that they have been adapted as an afterthought to fit the existing design. This is rather surprising, as with large engines and heavy roads one surely requires an effective kick-starter—not one which necessitates dismounting and jacking the machine on the stand ere one can use it to full effect. As a rule, the design of the American kick-starter aims at turning the engine over at an unnecessary rate of speed, with the result that considerable energy must be expended in operating it, while if the engine is very stiff when cold the whole mechanism is likely to be strained. It is seldom, indeed, that one comes across a second-hand American machine the kick-starter of which is in proper working order.

## A Selection of Letters from Readers scattered all over the World.

## English and American Machines in Ceylon.

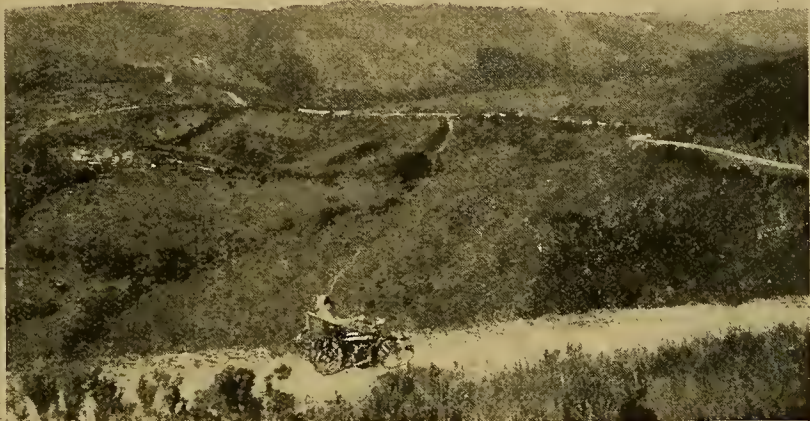
THE REV. A. M. WALMSLEY, Kandy, Ceylon, writes: "A word about the 1917 Powerplus Indian. Correspondence has appeared from time to time in *The Motor Cycle*, with arguments between admirers of English and American machines respectively. Some time ago an A.J.S. enthusiast asked an Indian enthusiast if he had ever tried a 6 h.p. A.J.S.

"Well, I have. I have driven all three models of the A.J.S., and, most excellent as they are, have deserted them for an Indian. Why? Why should I yank a 3 cwt. Yank about? Because no English machine yet put on the market will meet my needs. I am an all-weather rider in an exceedingly mountainous country, with a family to haul about on roads sometimes atrocious. I therefore consider the following essential: Spring frame, 28 x 3 in. tyres, big ground clearance, weather-proof transmission, a big reserve of power, and a smooth transmission in which solidity of drive can be varied immediately to suit widely varying conditions. I consider the following extremely desirable: Twist grip control (no tap twiddling and no rusted-up controls after a monsoon downpour), pilot jet, hot air intake, a well-silenced engine and valve gear, a sheet steel sidecar (coachwork cracks and peels in this damp heat), dual clutch control, mechanical oiling, and good service in the matter of spares and replacements.

"At present the Indian is the only mount for me—the less said about the quality and finish of details the better. And when my friends enquire about petrol and oil consumption I change the subject. But I believe that if the Powerplus Indian were turned out by, say, the A.J.S. people, it would sweep the market in its own class.

"Finally, sir, I trust you will keep up your campaign in favour of Overseas models.

American engines are generally good, though certainly not superior in balance to our own. Even American four-cylinder engines generally possess a marked period. We are not attempting to depreciate the engineering abilities of our cousins across the herring-pond, and these friendly comparisons are made in full realisation of the fact that we are both tackling the same problems from different standpoints, and com-



TYPICAL SOUTH AFRICAN LANDSCAPE.

Near the Zuurberg, fifty-two miles from Port Elizabeth. Deep sandy roads are the order in the dry season. The sidecar is a 3½ h.p. Humber.

parison, therefore, should be constructive rather than destructive. Appearances are nothing to go by, except that in engineering practice neatness is always to be commended. Ugliness signifies nothing, for as a rule it simply implies the unconventional.

"I venture to think that my own needs and views would be backed by thousands in India and Ceylon, Canada, Africa, and Australasia, and therefore trust that they may find a place in your eagerly-looked-for and valued paper."

## A British Machine under Severe Test.

MR. NORTON replies to a critic: "I have been extremely interested in the selection of letters from readers scattered all over the world," and particularly in the appreciation from Lieut. G. Mathieson, regarding the Norton Empire Model. I am always pleased to receive criticism of our machine—in fact, am very desirous of so doing.

"Now with regard to the first criticism—the silencer support. This is not, as Lieut. Mathieson apparently understands, attached directly to the magneto platform, but is secured by two strong lugs to a specially strengthened lug on the crank case, and in such a manner that, however severe a blow the silencer may receive, it would swing on its supports and avoid damage to vital parts of the engine, which would probably occur were the silencer rigidly secured as is the case with many machines. (I have known instances of portion of a crank case being torn completely away for this reason.)

"In order to prevent rattle or loosening of the silencer, a flexible steel strap natted to an extension of the rod supporting the magneto platform passes and is welded partly round the front centre of the silencer body, forming an effective strengthening rib to resist blows. One even of sufficient force to crush the silencer would be very unlikely to affect the magneto in any way, the lowest point of which is 10½ in. from the ground, the engine clearance being 6½ in.

"With regard to the second criticism—the type of front brake—I am quite with the Lieutenant in this, and intend



## Overseas Comments.—

to set out a type of brake acting independently of the wheel rim. Just what form this will take is not yet decided.

"Another innovation, which will doubtless appeal to him and also to his Colonial friends, is that provision has been made to fit 700×80 mm. (approximately 28×3in.) tyres when desired. These will still further increase the ground clearance to a minimum of approximately 7in.

"It is highly gratifying to me to learn the design generally meets with the approval of those for whom it was intended.

"There have been some thrilling moments upon occasion—when, for instance, in spite of brake-locked wheels, the outfit has slid bodily forwards or backwards down some steep declivity when the sprag has failed. Once when riding cautiously round the edge of a wood upon a hillside sloping steeply down to a lake, the outfit suddenly changed its direction, and went off at right angles blithely sliding sideways down the hill. Then ensued a very thoughtful few seconds, as, gathering speed, the machine zigzagged sideways downwards until a friendly root trapped a wheel sufficiently to deflect the machine and cannon it into a tree, where for a brief period it hung, partly suspended, and then began

gradually to slip round it until the sidecar lamp, reaching the trunk, was slowly crushed and torn away, and the bracket twisted out of shape; but it had done its work, giving sufficient pause for a hurried dismount and a desperate push, which again deflected the falling machine into a twin tree, the two trunks of which held it—and then away for help."

## Foot-controlled Gears.

S. A. CROMBIT, Winnipeg, Canada, favours selective clutch gear control:

"Some little time ago I owned a Scott two-stroke, which my brother brought out here for me, and which served me excellently save for its shallow ground clearance. Recently I bought a 3½ h.p. Sunbeam, which I consider an ideal machine, except that I find the hand-controlled change speed awfully clumsy after the Scott. Most of the roads out here are very rough, and one has to change gear constantly. Every change makes it necessary to release the handle-bar with one hand, whereas with the Scott one merely taps the gear in or out with one heel. The hand-controlled clutch is excellent, but if the gear box were foot-controlled it would, in my opinion, add enormously to the tractability of the machine for Overseas use."

## MOTOR CYCLES IN CANADA.

The following figures have been supplied to us, not without difficulty, by the Canadian Government Trade Commissioner, and should be of interest to those concerned in the growth of Overseas sales.

THE number of machines in use in Canada has gone up steadily since 1912, the province of Ontario offering, as might be expected, the most promising markets. The returns for Alberta are rather disappointing, but this province is opening up very rapidly, while the same applies to the province of Saskatchewan. British Columbia is hardly a motor cyclist's paradise on account of the mountains, though there is a good opening for lightweight machines in the vicinity of Vancouver City.

It will be seen from the first table that Canadian demands are at present entirely met by American manufacturers, the number of British machines imported being negligible. This state of affairs is regrettable, and the most strenuous efforts of salesmanship will be necessary when normal conditions return if the British manufacturer is to obtain any footing whatever.

## Imports of Motor Cycles.

The Department of Customs report that prior to April 1st, 1915, motor cycles were not separately distinguished in the Canadian Trade Returns, but at the same time they furnished the official returns for the period 1912-16 of imports of automobiles and also bicycles and tricycles, which we reproduce herewith.

Since the 1st April, 1916, the returns have been subdivided into "automobiles passenger," "automobiles freight," and "motor cycles and motor vehicles of all kinds, not otherwise provided for," and the figures for the fiscal year ended March 31st, 1917, were:

	No.	Dollars.
From United Kingdom ...	4	779
„ United States ...	1,097	176,845
Total ...	1,101	177,624

## Motor Cycles Licensed.

According to official figures supplied by the various provincial Governments, the number of motor cycles returned as either registered or licensed in the individual provinces for these years was as follows:

## ONTARIO.

Figures supplied by Chief Clerk Motor Vehicles Branch, Department of Public Highways, Toronto:

	1912.	1913.	1914.	1915.	1916.	1917.
Motor cycles registered ...	1,754	2,900	3,633	4,178	4,287	*5,100

\*Estimated to date.

## QUEBEC.

Figures supplied by Director of Automobile Bureau, Treasury Department, Revenue Branch, Automobile Bureau, Quebec:

	1914.	1915.	1916.
Motor cycles registered ...	205	296	460

No figures kept prior to 1914.

## NEW BRUNSWICK.

Figures supplied by the Provincial Secretary, Fredericton, N.B.:

	1913.	1914.	1915.	1916.	1917.
Motor cycles registered ...	42	68	101	91	125

## Nova Scotia.

The Deputy Provincial Secretary, Halifax, N.S., writes that "the total number of motor cycles in respect of which permits are in force is 150. This is practically the number of cycles registered since the year 1907."

## PRINCE EDWARD ISLAND.

Figures supplied by the Provincial Secretary, Charlottetown, P.E.I.:

	1914.	1915.	1916.	1917.
Motor cycles registered ...	3	3	2	4

## MANITOBA.

Figures supplied by the Provincial Secretary, Winnipeg, Man.:

	1913.	1914.	1915.	1916.	1917.
Motor cycles registered ...	899	949	943	939	923

## ALBERTA.

Figures supplied by the Provincial Secretary, Edmonton, Alberta:

	1914.	1915.	1916.	1917.
Motor cycles registered ...	387	390	411	415

## BRITISH COLUMBIA.

Figures supplied by the Provincial Secretary, Victoria, B.C.:

	1913.	1914.	1915.	1916.	1917.
Motor cycles registered ...	868	948	920	850	—



"The Proof of the Tyre is in the Running."

NORTH BRITISH

# CLINCHER

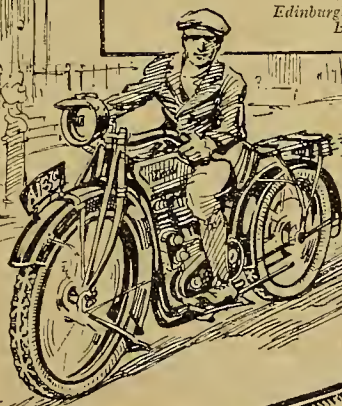
## Motor Cycle TYRES

### Riding in Town

—when sudden swerves and sudden stops are inevitable—the famous non-skid tread of the "Clincher" de Luxe Stud Tyre proves its gripping-power; for this tread is no mere pretty pattern, but a practical non-skid, effective even on the greasiest of road surfaces.

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£10 will be paid for information which may lead to the recovery of a "Royal Enfield" 6 h.p. Combination. Registration No. MX 6661, Engine No. W 5071. Special screen and hood, Watford speedometer No. 705, 1915 make. Also the same amount will be paid for similar information leading to the recovery of a 1914/15 3½ h.p. Twin "Zenith." Engine No. 52830, mag. chain case slightly damaged. "Matchless" 8E Model, Engine No. 34572, Frame No. 3041, Regd. No. LR 3765 undertank tube cracked at head.

H.P.

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Exceeding £50.

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£2 10 0

3½

2 10 0

2 15 0

4½

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3 0 0

5-6

3 0 0

3 10 0

7-9

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4 7 6

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25% " " " " £2 " "

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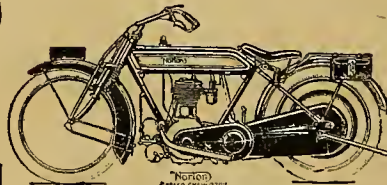
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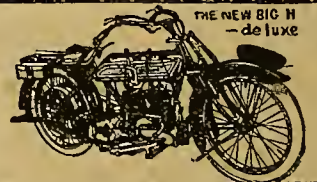
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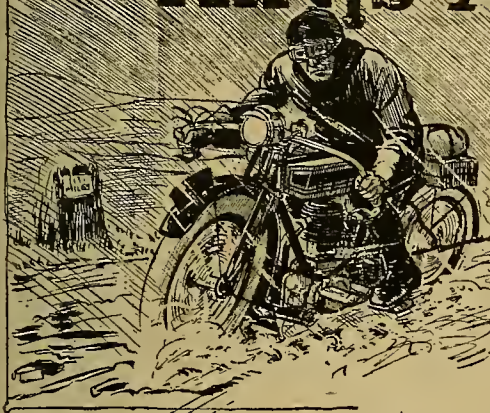
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# HINTS AND TIPS FOR WINTER RIDING.



COMMENTS—  
HUMOROUS AND OTHERWISE—  
ON MOTOR CYCLING IN WINTRY  
WEATHER.

ON the principle that many minds are more fertile in ideas than one, we have, this year, appealed to our leading contributors to make up our usual "Winter Hints and Tips" article, each taking his chosen subject. We fear that one or two have not regarded our request so seriously as it was intended, and we beg to tender our apologies—especially for "Road Rider."

## LAMPS AND LIGHTING.—"Ixion."

This topic seems somewhat of a mockery this winter, when our petrol is cut down to little more than a smell, and if we can get any petrol, we are hardly allowed any lights. However, we must make the best of things, and happy is he whose 'bus consists of a sidecar outfit with a Lucas dynamo set comfortably installed. It is not a cheap equipment in first cost; but, once bought, it can be relied upon to combine the maximum of light with the minimum of trouble and mess—and how peacefully it solves the harassing problem of a tail lamp! Those who have used it long for the day when solo mounts shall possess a dynamo outfit of similar class; but up to the present moment I have failed to discover an outfit designed for solo machines which possessed a sound battery; and to run a powerful lamp off a small battery is asking for trouble with a capital T. Though there is at present

a ban on acetylene, a few hints regarding its use may nevertheless be acceptable. The second-best outfit, which is also the cheapest no-trouble outfit, consists of a DA cylinder, which are now very difficult to obtain; it is cheap and absolutely reliable. Lucky owners of these cylinders may choose whether they will run their tail lamps on acetylene or not. An acetylene tail lamp cannot be too strongly made, and cheap stuff in this line is *anathema maranatha*. Moreover, at the start of a winter season, fresh rubber tubing of the best quality should be procured, and well fitted. Good fitting does not mean straining the tubing, and wiring it on to the connections, but rather: (1.) Choose a tube which is a very tight fit on the connections. (2.) Have it as tight as you like between its terminal supports on the bicycle frame, but leave a fair amount of slack in the two ends, so that they can be cut off when they fray. (3.) Fasten the tube to the frame with insulating tape; nothing else makes a safe hold without pinching. (4.) Be careful not to lead the tube where it is liable to be nipped either by the rider's body or any part of the mechanism. (5.) The ends of the tube must be a jam fit on the connector stubs of the lamp and generator; if they are wired on, it will let the last foul exhalations of gas pass through the burner and soot it up whenever you extinguish a spent charge.

## Tail Lamps.

But I do not personally consider that acetylene is the best illuminant for tail lamps, though the trade has never perfected the correct goods in my pet line. A tail lamp need be very little more than a glimmer, and quite a compact dry battery will feed a wee tail lamp bulb for the potterer's normal in-and-out winter work, particularly now that we are on petrol rations. Unfortunately, the dry battery tail lamps now marketed are really too light for motor cycle work, their attachments being despicably shoddy. But as their contours are usually rectangular, a broad webbing strap will usually make them pretty safe on the offside pannier bag.

Generator freezing has only to be guarded against when machines are kept in a very cold house, or left standing

outside—ahem!—business premises by the hour. In the former case, a good dodge is to take the generator off after each spin; in the latter, dilute the water with a little of the liquid which causes the said business premises to be thronged from 6 to 9 p.m. under Dora's beneficent regime. If you are one of those strong, silent men who actually ride the night through with the thermometer below zero, and freeze up generators whilst you are in the saddle, buy the poor thing a ponyskin cover or an Instra warmer; or—more simply—use a combined lamp and generator, in lieu of the separate sort. This latter advice only applies to strong, silent men, as combined generators are not really very nice, and heat-conduction is the only virtue with which I can credit them.

## LUBRICATION AND CARBURATION.—H.M.B.

The finest winter lubricant I know is served in a glass with sugar and a slice of lemon. This, however, is not good for the hubs and steering head; and the rider of to-day, where he survives, is not going to spend much time in making up what manufacturers have omitted by fitting his machine with water and mud-excluding caps for the hubs. The best



"Our petrol is cut down to little more than a smell."



"An acetylene tail lamp cannot be too strongly made, and cheap stuff in this line is *anathema maranatha*!"



### Hints and Tips for Winter Riding.—

tip is to kick off the autumn by seeing that there is not the least atom of play in the wheel bearings; then screw out the foolish little oil cups, and pack the hub thoroughly by the use of a grease gun, using crude vaseline. This can be bought at the chemist's or oil merchant's at a few pence per pound. At regular periods throughout the winter repeat this treatment, forcing the lubricant into the hubs so that it squelches liberally from the cones, thereby carrying all grit and foreign matter with it. Do not box in your front wheel, as this is sure to lead to trouble with the cones. Vaseline is better than stiff grease, as the latter is apt to clog and hold aloof from the vital parts. Gear oil—that variety that “clings to the teeth” is excellent, as also is Prices' hub lubricant; but both these are a shade on the thin side, and are apt to drain from the cones of their own accord. What is required next to properly designed hubs is a clean cushioning substance that fills up all crevices to the exclusion of foreign matter.

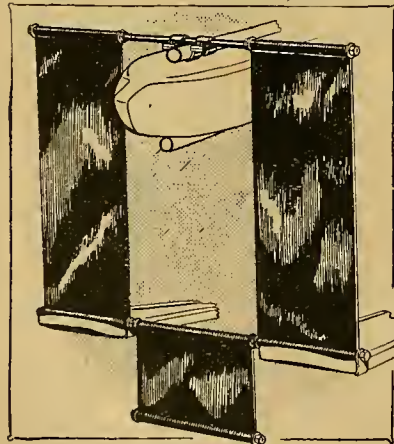
### Air Leaks.

Take no risk of air leak in these days when fuels are outweighed only by the hearts of those who can't get them. Wrap all suspicious joints with insulation tape; smother all threads on the induction system with gold size or seccotine. If you are using petrol for starting only, and a heavier fuel for running, take your lead from the auxiliary tank straight to your jet (to the pilot, if you start on the pilot), as this does away with the necessity for draining the float chamber. When starting, the petrol is turned on at the auxiliary tank for a second or two, whereupon a good flow of petrol issues from the jet, and also fills up the float chamber. The petrol must be turned off instantly, or flooding will occur.

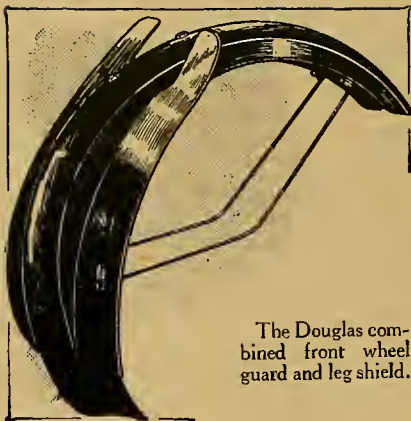
### LEG SHIELDS AND CLOTHING.—

#### “Chinook.”

Now that the tinmiths and tinkers are busy, the few motor cyclists who remain on the road will be called upon to improvise shields as best they can; for winter riding without some such fitments is a miserable affair of mud, wet, cold, and slush. Few riders of

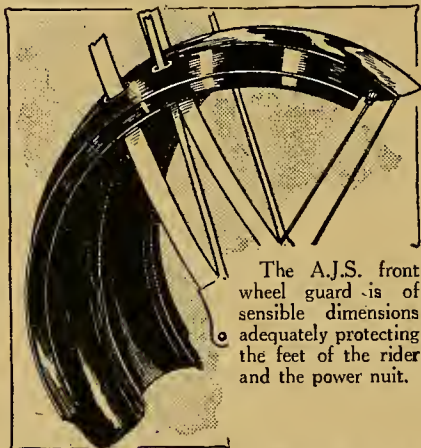


A light and simple home-made leg shield. Wooden struts can be used in place of the iron bars shown.



The Douglas combined front wheel guard and leg shield.

experience, indeed, would contemplate tackling a winter without leg shields of some sort, and the desirability of these fitments is now generally realised. It is probable that in due course manufacturers will provide quickly detachable shields, enamelled and in general harmony with the machine. I say “quickly detachable,” because the design of most



The A.J.S. front wheel guard is of sensible dimensions adequately protecting the feet of the rider and the power unit.

motor cycles, with the exception of the Scott, does not lend itself to the permanent variety. The P. and M. and Sunbeam leg shields, for instance, are excellent for winter use, but in summer one is more comfortable without them, for, quite apart from the question of weight and wind resistance, they kick up considerable dust, of which not only the man behind, but also the rider himself, gets a goodly share.

The type of shield made by the local tinmith is not generally a success. As a rule, it presents unnecessary wind resistance; usually it is heavy, and invariably its tinniness has a sonorous effect as regards the noises of the engine. This latter drawback is its most objectionable feature. I have tried several, and have generally shed them within a fortnight or so on account of the manner in which they imprisoned and threw up the noises of the engine. Finally, I have come to the decision that next to the works-produced article the very best leg shield is the temporary home-made affair. It scores on the point of cheapness, light weight, and a minimum of wind resistance. Of course, it is very easily broken, and the Juggins who indulges in two sideslips per week has no

particular use for it. It is safe on a sidereal machine, however, and very few riders nowadays experience many spills.

### Making a Simple Shield.

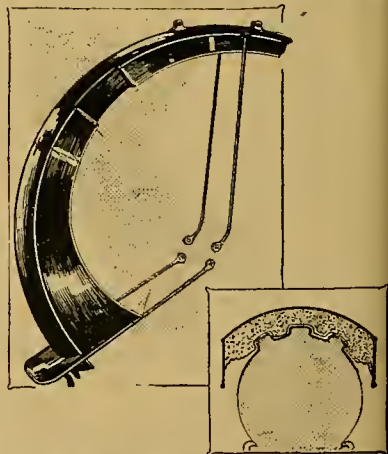
Merely attach a fairly stiff garden bamboo crosswise to the underside of the middle or top bar, as near to the steering head as possible, as shown in the accompanying sketch, and from this extend downwards to the toe ends of each of the footplates two strips of canvas or tarpaulin, or, better still, thin stiff fibre. The shields can be generally attached to the footboards or footrests in some efficient manner, but, if not, it is an easy matter to have some kind of a cross support made at the local smithy. Between the two shields, and hanging downwards to within an inch of the ground, a flap should be provided, as also shown in the sketch. The bottom of this flap is weighted by means of a short length of iron bar sewn into the fabric so as to keep it in a more or less vertical position.

This flap performs a very important function, its purpose being to intercept and convey back to the road mud flicked up by the front tyre below the level of the front wheel guard, also mud that drops from the bottom of the guard and is blown back. Normally this mud is plastered on to the underside of the crank case and gear box, and finds its way to the transmission, and finally some of it is thrown all over the rider and machine.

The same effect can be arrived at by fitting a tray under the engine and gear box, but the flap is rather better because a tray acts merely as a catchpit for oil, etc., from the engine. On a two-stroke the flap offers the additional advantage of shielding the crank case from cold air and water, and thus prevents crank case condensation. The whole fitment weighs but a few ounces, costs only a few pence, and can be made by anyone skilled with a pair of scissors and a penknife.

### Personal Comfort.

As regards personal comfort, one of the best safeguards against cold lies in seeing that one's gloves, overalls, etc., are thoroughly dried between each ride.



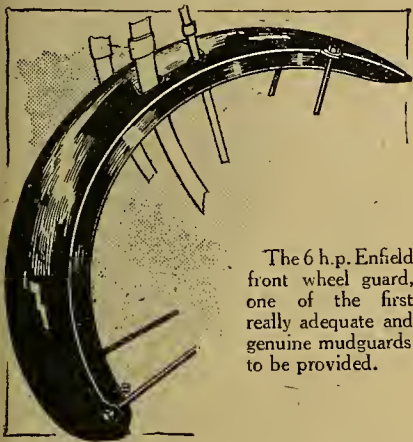
An undesirable design of front wheel mudguard. Its narrowness and shallow clearances cause the mud to collect and jam, as shown in the small inset.



**Hints and Tips for Winter Riding.—**

Some riders are very careless about this, and it is impossible to keep warm in damp, heavy clothing. One's gloves, particularly, should occupy a peg above the kitchen range between intervals of use, as cold hands lead to general chilliness. Another thing which will cause one to become chilled in short time is a draught about the wrists; long gauntlets are an obvious prevention.

In the way of clothing, I used to favour tarpaulins with a good Burberry underneath, but have transferred my



The 6 h.p. Enfield front wheel guard, one of the first really adequate and genuine mudguards to be provided.

affections to all Burberry—two coats with a belt. Tarpaulin pull-on leggings are all right, but one must wear good boots in conjunction with them, otherwise the water that drains down the legs percolates in through the lace holes. A tarpaulin mackintosh collects puddles, which, on shifting one's position, empty their contents into the nooks of one's armour, and one develops exceedingly wet patches. This does not occur to the same extent with Burberry; but whatever one wears the water is sure to find one or two weak points during a long wet ride.

**KEEPING WARM IN WINTER.—**  
**"Road Rider."**

The best way to keep warm in winter is to stay at home. [How about coal this winter?—Ed.] I mean—in bed. [No coal, no hot water bottles!—Ed.] If your coal-hoarding efforts have been cursed with failure, publicans as a rule have been more succe—. Well, if you really want to go out in the cold on that most admirable of all refrigerators, a motor bicycle, confine your rides to two periods of the day; namely, 12—2 p.m. and 6—9 p.m. Keep your rides as short as possible. A chart published by the Strength of Britain Movement indicates in what parts of the country a motor cyclist can rely upon finding a warm roadside welcome at the most frequent intervals. Broadly speaking, such welcomes abound where the population is thickest, though the Carlisle district is at present a notable exception to this rule. The West Country and the Highlands are singularly tantalising to the winter rider from this point of view. On the one hand, their roadside welcomes are few and far between; on the other

hand, the local beverages, especially when taken hot with lemon and sugar, are quite unusually grateful and comforting.

There is no clothing which can even make a pretence of keeping a motor cyclist warm in winter. If you don a trench ponyskin jacket under a high-flying aviator's kit, they will suffice to slow down the inevitable radiation of such heat as you possessed when you were fool enough to leave home. Starting at a high temperature and keeping the ride short are the two cardinal points. The first is secured by a half hour doss in the nearest bakehouse oven before the temporary insanity of starting out overtakes you. The second is automatic; within half an hour you will certainly be so cold that you will get off and cry. Crying will not warm you; it is wiser to push the machine fast up the nearest steep hill; if overtaken by frost-bite in the Fen district, try pushing the machine with low gear engaged and the valve lifter down, which is tolerably efficacious.

**The Goods for the Flapper Bracket.**

Whilst on this subject, I may add that it is the height of folly to use your flapper bracket in winter time for any other purpose than carrying Thermos flasks and Primus stoves. I know that the proper occupant looks "extra" in a little fur cap with a red top to it, and a suggestion of ermine at her throat; and if she steadies herself properly against you, an illusion of warmth may be created. The warmth is illusive, I say, because the head draught on your forward aspect will soon cool your front half, and she will conduct off any heat from your hindmost longitudes; so the only difference her presence makes is that you will be stone cold fore and aft instead of only fore. Above all, don't think of her as she looks when she trips down the steps of her parental domicile to take her seat. Think of her rather as she will be five miles along the road. Her nose blue, her toes frostbitten. Her temper—! I would save you from becoming a life-long misogynist, if possible; for I admit, with reservations, that the little things are not bad in their



"Warm and dry."

proper place and at proper times. In winter their proper place is a cosy corner, not a flapper bracket.

**Keeping the Machine Warm.**

A word should perhaps be added on keeping the machine warm. When it gets chilly it will not start; and not infrequently when you try to vary the engine speed you cannot, because the throttle has frozen. Much misfiring is also due to the inlet pipe becoming chilled. The first nuisance is really a blessing, because it often prevents your going out at all; when it happens at your turning point, the best thing is to wait till one of those peculiar gentry comes along who carry a gasbag on a four-poster above the machine. Detach his gaspipe—by persuasion or force, as



How to keep warm in winter (our artist's opinion).

circumstances may dictate—apply a light to it, and play the resultant blowpipe gently on your cylinder, carburetter, fingers, toes, nose, and ears, till a mellow warmth diffuses itself. Should your throttle freeze, run a little petrol out of your tank into any handy receptacle, such as the stopper of your tank, and try to light it. If it can be lighted, it is pre-war petrol, and you can pour the blazing fuel over your throttle and thaw it; if it will not light, it is war petrol or substitute. In either of these cases it is hopeless to attempt to ignite it without some fulminate of mercury, which should be carried for the purpose. Failing the necessary fulminate, a little Martell Three Star must—yes, in all solemnity, I say **MUST**—be used to thaw the throttle; a *reductio ad absurdum*, which illuminates the folly of winter riding. By the way, there is no particular reason why you should not continue riding on the valve lifter, instead of thawing your throttle, and so save your Three Star. Of course, if you have to stop, and the throttle is frozen in such a position that the engine will not start on it, you will be in something of a quandary. You might try taking the throttle to bits and breathing on it. This is all I know about keeping warm in winter.

[Again we apologise for "Road Rider." His exemption has just been cancelled, and he is consequently a trifle morose this week.—Ed.]



# Current Chat

## TIMES TO LIGHT LAMPS.

### GREENWICH TIME.

Nov. 29th	...	...	4.24 p.m.
Dec. 1st	...	...	4.23 "
" 3rd	...	...	4.23 "
" 5th	...	...	4.22 "

## Price of Petrol.

The price of petrol was reduced on Monday, No. 2 War Spirit now being 3s. 7d. per gallon, and No. 3 3s. 6d. per gallon. Paraffin has been reduced 1d. per gallon.

## Motors and Farming.

The old established farming journal, the *Agricultural Gazette*, which has recently been acquired by the proprietors of *The Motor Cycle* and its sister papers, will be found not only interesting but extremely helpful to such of our readers as are engaged in farm management or any form of agricultural practice. It is now over sixty years since the *Agricultural Gazette* was established, and during its long career it has been held in high repute by succeeding generations of farmers. Under the new owner-

## SPECIAL FEATURES.

### AEROPLANE ENGINES.

### HINTS AND TIPS FOR WINTER RIDING.

### A STEAM MOTOR CYCLE.

ploughs, tillers, mowing machines, etc., the *Agricultural Gazette* does not in any way neglect the many other aspects of modern farming.

This journal is obtainable from any newsagent, and is published every Tuesday, price one penny. A free specimen copy may be obtained by applying to the publishers, 20, Tudor Street, London, E.C.4.

### Petrol for Soldiers and Sailors on Leave or Convalescent.

With regard to the paragraph which appeared in our issue of the 15th inst. stating that licences allowing petrol to be used for any purposes are granted to officers on leave from the various fronts, we are able to state that these facilities are also accorded to men of both the Navy and Army.

### Comparative Costs.

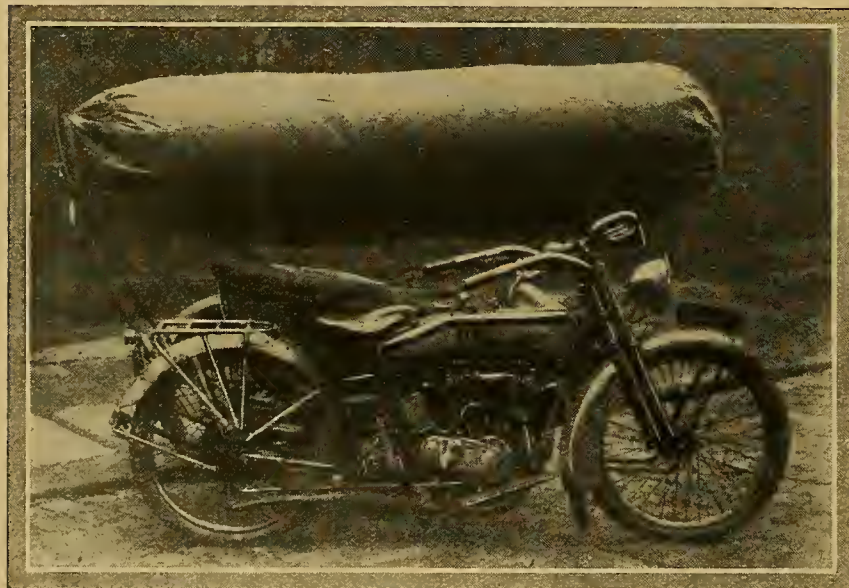
In asking for information about the new petrol restrictions, a correspondent states that he has been using his motor cycle and sidecar for the delivery of his goods, his business being that of a wholesale and retail confectioner—and that his total expenses averaged 10s. per week. Previously he had used a horse and trap, but as the cost of keeping the horse was 30s. per week he turned to the sidecar, thus effecting a direct saving of £1 per week. He is, however, now no better off than before, as the Petrol Controller has refused him a permit!

### War-worn Cudham Road.

At the last meeting of the Bromley (Kent) R.D.C., it was stated that the road from Cudham to Green Street Green was in a terrible condition—ruts 4in deep, overhanging trees and hedges, and at least 1,000 yards needing repair. The complaint was referred to the Road Board.

### Startling Kent Road Changes.

Motor cyclists visiting some of the favoured Kent road haunts near London will notice sad changes. On the Maidstone Road through Seal Woods, the pine and fir trees have been cut down for over a mile on each side. Whole tracts of forest and woodlands skirting the Westerham, Edenbridge, and other roads are almost unrecognisable. Even the test hill district has not escaped this commandeering, and familiar landmarks have disappeared.



### A COMMERCIAL TRAVELLER'S OUTFIT.

A Harley-Davidson sidecar running on coal gas. It is the property of a London traveller, but was photographed at a halt for filling at Keighley, Yorkshire, where fifty feet of gas was supplied by the Corporation for twopence, including receipt. The machine has run regularly for two or three months on gas, and one filling will carry it twelve miles.

## National War Relief Funds.

The National Relief Fund (distributed £3,705,822)	..	..	£6,284,566	0	0
British Red Cross Fund	..	..	8,116,969	0	0
King George Sailors' Fund	..	..	82,742	0	0
Tobacco Fund	..	..	140,742	0	0

## A New Sphere of Usefulness.

A real Tank took up a position in Trafalgar Square, London, on Monday morning this week for the sale of War Bonds. The public are allowed to go inside and make their purchases, and each Bond sold bears the imprint, "British Tanks W.S.A."

Included in the exhibition of war relics is a Hun anti-Tank gun.

ship, all the features which have contributed to its success in the past will be retained, as will also the services of its expert writers and contributors on general farming topics. To these has been added a practical engineering staff to deal with the increasingly important subject of motor machinery for farm work. As a result the journal in its new form will fill the need which undoubtedly existed for a practical all-round farming paper, covering the very wide range of farming interests in its entirety.

While specialising on the engineering side and giving the latest and fullest information regarding farm tractors, motor



**Home-made Clutches.**

A French correspondent is anxious to receive a design from a reader for a home-made clutch for a  $3\frac{1}{2}$  h.p. single-cylinder belt-driven machine. He requires something which is simple to build and efficient and with the minimum number of parts. Any design sent to this office will be forwarded to our correspondent.

**Another Two-stroke Raffle.**

The North Wales Motor Exchange, Chester Street, Wrexham, has, in response to an appeal, decided to raffle a brand new Ixion two-stroke for the 17th R. Welsh Fusiliers now fighting in France. This machine is to be drawn for with a view to procuring funds which will enable the 19th Battalion of that regiment to purchase a band. Tickets will be sold, on application to the above-named firm, at 6d. each or books of twenty-five tickets for 12s.

**Petrol Restriction Persecutions.**

One motorist has been fined 40s. at Pontypool Police Court for using petrol contrary to the new regulations. Defendant pleaded that he was going to Cardiff on business, and his solicitor clearly showed that there was no convenient train service or other means of transit. This evidence, however, carried no weight with the court.

**Another Case.**

On the other hand, a motorist summoned at Manchester for using petrol illegally in a car (on a Sunday afternoon), pleaded that the car was the only means by which he could conveniently reach two farms where he had to inspect and purchase cheese, which he used in his business as a provision merchant.

The prosecution suggested that he could have gone by train to Knutsford and then hired a conveyance for the re-

mainder of his journey—some ten miles. The absurdity of such a contention as this would be obvious to anyone familiar with these parts of the country but a policeman, and the magistrates themselves seem to have held the same view, for the defendant, who was defended by the Automobile Association, was discharged.

**Queries and Replies.**

From its very inception *The Motor Cycle* has devoted a page to the answering of readers' queries on all matters pertaining to motor cycling, and readers have freely availed themselves of our offer to give advice and assistance wherever possible. There is one simple condition attached to the answering of these queries, and that is that a stamped and addressed envelope be enclosed for reply, and this condition has been printed every week without intermission for some fourteen years. Nevertheless, we are constantly receiving queries from readers who do not conform to this simple rule.

**Soldier Querists.**

Naturally, we do not expect stamps, etc., from querists writing from abroad, or serving with the Forces.

**Answering Queries in the Paper.**

Possibly some readers have the opinion that queries are directly answered through the columns of the "Questions and Replies" page. This, however, is not the case. Every query is answered through the post. Those published are simply a small selection from such of the weekly batch as are likely to interest readers as a whole. Sometimes we have most extraordinary questions asked, that could not possibly interest motor cyclists purely as such. For instance, one querist recently asked us to explain why gun wheels were dished, and what was the difference between shrapnel and high explosive shells! We do not pose as

walking encyclopædias, and do not necessarily undertake to answer such matters so foreign to our province as these, though in this particular case we sent our querist away happy.

**Old Age and the Flapper Bracket.**

A correspondent who is driving a Metro two-stroke informs us that he regularly takes his mother on the carrier. She is seventy-six years of age, and does not display the slightest sign of nervousness. We hope that this plucky old lady will long be spared to continue to enjoy the delights of motor cycling.

**Gasbag Alight.**

Recently one of the Loughborough Road Car Co.'s motor 'buses was recharging with coal gas when by some mysterious means the envelope on the top of the 'bus caught fire. The driver got all the passengers out of the vehicle, which he then turned on to the Market Square, where a fire hose was utilised to extinguish the flames, which continued to burn till the gas was exhausted. Very little damage was done to the vehicle beyond the destruction of the gasbag.

**Average Prices.**

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C. ....	1914	31 2-speed .....	—	£42
Abingdon ..	1914	5-6 3-sp. sidecar ..	—	£56
A.J.S. ....	1916	6 combination ..	£90	£100
" .....	1914	6 combination ..	—	£70
" .....	1916	4 combination ..	—	£57
Allon .....	1916	2½ 2-speed .....	£27	£31
Ariel .....	1915	3½ 2-speed .....	—	£68
" .....	1914	5-6 combination ..	£45	£54
Bat .....	1914	6 3-speed .....	£45	£46
Bradbury ..	1914	4 2-sp. sidecar ..	£34	£40
Brough .....	1916	3½ 2-speed .....	—	£54
B.S.A. ....	1916	4½ sidecar .....	£62	£62
" .....	1915	4½ sidecar .....	£57	£60
Calthorpe ..	1916	2½ 2-speed .....	£30	£30
" .....	1916	2½ 2-stroke .....	—	£29
Clyno .....	1915	2½ 2-stroke .....	—	£25
" .....	1914	6 combination ..	—	£61
Connaught ..	1915	2½ 2-stroke .....	—	£20
Douglas .....	1916	2½ 2-speed .....	£48	£48
" .....	1915	2½ 2-speed .....	£30	£44
" .....	1914	2½ 2-speed .....	£35	£38
Enfield .....	1916	6 combination ..	£92	£83
" .....	1915	6 combination ..	£65	£75
" .....	1916	3 2-speed .....	—	£45
Excelsior ..	1915	8 2-speed .....	£42	£40
H.-Davidson ..	1916	7 combination ..	£78	£86
" .....	1915	7 combination ..	£65	£70
Henderson ..	1916	7 combination ..	—	£100
Humber .....	1915	6 combination ..	—	£60
Indian .....	1916	7-9 combination ..	—	£80
James .....	1916	4½ combination ..	£63	£65
" .....	1916	2-sp. 2-stroke ..	—	£33
Lea-Francis ..	1916	3½ 3-sp. sidecar ..	£63	£63
" .....	1915	3½ 3-sp. sidecar ..	—	£58
Levis .....	1916	2½ Popular .....	£25	£24
" .....	1915	2½ Popular .....	£22	£22
Matchless ..	1915	7 combination ..	£70	£81
New Hudson ..	1916	2-sp. 2-stroke ..	—	£28
" .....	1916	4 combination ..	—	£58
New Imperial ..	1916	2½ 2-speed .....	£27	£35
" .....	1915	2½ 2-speed .....	£25	£25
Norton .....	1916	3½ 2-speed .....	—	£53
" .....	1915	3½ T.T. ....	—	£43
P. & M. ....	1915	3½ combination ..	—	£60
" .....	1914	3½ combination ..	£43	£51
Premier .....	1915	2½ 3-speed .....	£42	£46
Royal Ruby ..	1916	2½ 2-stroke .....	—	£22
Rudge .....	1916	3½ Multi .....	—	£43
" .....	1915	3½ Multi .....	—	£42
Scott .....	1916	3½ combination ..	—	£65
Sun .....	1915	2½ 2-speed .....	—	£19
Sunbeam .....	1916	8 combination ..	—	£112
" .....	1916	3½ solo .....	—	£73
" .....	1915	3½ combination ..	—	£76
Triumph .....	1916	2-sp. 2-stroke ..	—	£37
" .....	1915	4 countershaft ..	—	£59
" .....	1915	2-sp. 2-stroke ..	—	£28
Velocette ..	1915	2½ 2-sp. 2-stroke ..	—	£26
Zenith .....	1915	8 Gradua .....	£65	£53

**THE FIGHTING AEROPLANE.**

A pilot watching his scout machine being prepared for a flight.

(Reproduced from "The Work and Training of the R.F.C.," by courtesy of "The Illustrated London News.")





# A.S.C., M.T. WORK.

LETTERS on the subject of work of the A.S.C., M.T., in the danger zone continue to reach us. Pte. W. J. Hutchinson and Cpl. Roberts having sent us caustic replies to J. W. Pearson and "O.C. Taxicabs." In consequence of the subject having had a thorough airing in these columns, however, we cannot publish them.

□ □ □

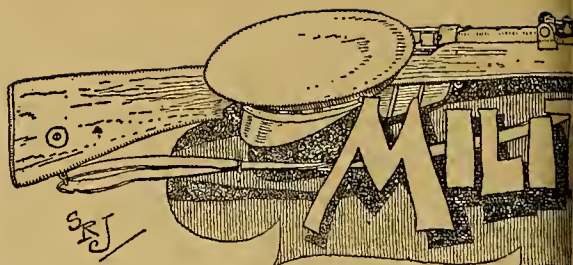
## PROMOTION FOR A MOTOR CYCLIST.

WE quote the following from the *Gazette* dated November 10th: "Special Appointment. Graded as Flight Commander.—Lt. C. Patteson, M.C., South Wales Borderers, from a Flying Officer, and to be a temporary Captain while so employed. (October 18th.)" In addition to having earned the Military Cross, Cyril Patteson has been the recipient of the *Médaille Militaire*. He has seen much fighting both in France and Gallipoli, and, as we announced about a year ago, he left the infantry for the R.F.C., so as to follow

# EGYPTIAN NOTES.

WE have received an interesting communication from a former member of *The Motor Cycle* staff, Cpl. T. W. Parker, who is serving with the Egyptian Expeditionary Force:

"My work is still of the same nature, and I am busy with both Douglas and Triumph machines, having charge of the spares supplied to all the motor cycles in Egypt. There is a fair sprinkling of Rudge, Clyno, and B.S.A., but Douglas and Triumph are practically universal. With regard to motor cycling by the civilian population, there is very little doing in this direction, although there are a few little garages in odd corners of the town. At the same time, most of the mechanics (?) have been used to heavy steam engines and cotton machinery, and do not understand the material or accuracy required in a petrol



standard fork spring were anchored the top in the existing cable lug, a small piece of bent steel attached to steering crown at the bottom.

"One of the greatest difficulties to be overcome is the effectual exclusion of sand from all working parts, and was very glad to see in *The Motor Cycle* an account of the new enclosed mechanism for shifting the gears in the new designed Triumph gear box. There is no doubt that the Triumph is a magnificent machine for the job, but there are one or two vital points that need attention. To begin with the design of roller bearing big end; personally I would prefer a large diameter roller bush. The rollers used cannot be accurate for long, as the length is too great for the width. Hoffmann themselves state that a roller cannot be made which would be serviceable in which the length exceeds the diameter. One or two machines here have been fitted with plain bearings, which have been quite a success. Another feature of design which must be altered is the spring which, to my mind, is most uncomfortable on wet *pavé* roads. If the machine would only adopt a central spring on Rudge lines, I am sure the majority of Triumph riders would note and appreciate it. Later on I expect



French transports and a group of drivers in a small village. The motor cycle in the foreground is a countershaft Triumph.

a career more after his own heart. He is a competition rider of long standing, and, for some time before the war, was in partnership with Victor Wilberforce, who is also flying, but for the Navy.

□ □ □

## M.M.G.S. IN PALESTINE.

CPL. GODSELL, L.A.N.B., about twelve months ago described his experiences with the M.M.G.S. in the Libyan desert, where he was in action. He now writes from Palestine, and says:

"I expect you have seen by the papers we have been in the fighting in Palestine, and have done very well. Our Captain obtained the D.S.O., both subalterns the Military Cross, and hope to do still more for the M.M.G.S. All the boys are in the best of health and spirits. I have very little to say concerning the old machines, as we have very little use for them here. Our work is chiefly with the cars and gun. I may say I receive *The Motor Cycle* fairly regularly, and always look forward to its arrival."

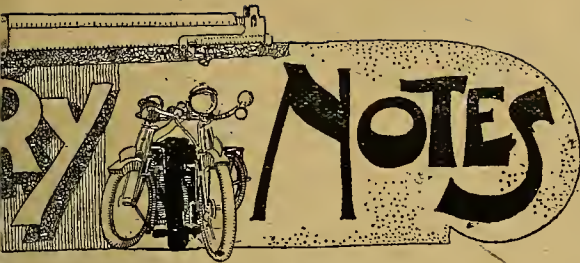
motor. I have done a fair amount of designing since I have been here, but not in the motor cycling sphere, and this has brought me in contact with three or four of the best engineering firms in the country. I was astonished at the lack of knowledge of the heat treatment of steel that prevailed in all these places, and the idea of working to even tolerances seemed impossible to them. It is the same with gear cutting, and I had a very laborious argument one day with an Armenian draughtsman who could not speak English very well.

"The expense of repairs would open your eyes, I am sure, as I know it is the usual thing to charge 100 piastres (just over £1) for cleaning the carbon off the piston and grinding in the valves—about two and a half hours' work at the outside. There are very few novelties to be seen with regard to making alterations to machines, but I did come across rather a neat idea recently. This was an extra spring fitted to the centre of the fork on a 2½ h.p. Douglas. The front brake had been dismantled, and the ends of a



A hut at Salonica after a "repairs. All the seven R.E.'s here must constitute a record. Front row: Chapman, N.E. Second row: Cpl. Taylor, T.; Cpl. Pfundt, C.





ain-driven model will be marketed, and s, too, will enhance still further the e qualities of this machine.

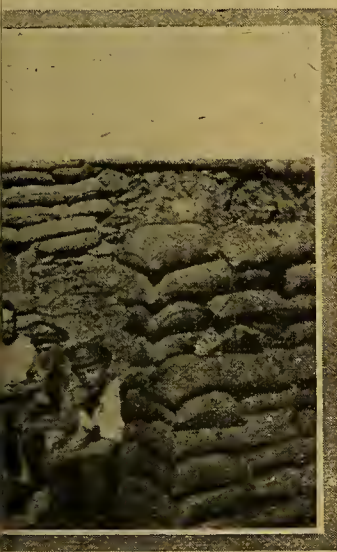
'The Motor Cycle' is splendid these ys, and seems in a most healthy con- ion, despite the petrol restrictions, ich almost tend to throttle civilian ing entirely. The recent article on : Blackburne cycle interested me very ch, as I feel pretty certain that after war machines of this make are going do very well. Both theoretically and ctically, there is not a better designed ine on the market, and great things ould be done on these machines in the ure.

'For some time I have had certain as on the making up of radiators for s, and also a new idea for copper kets motor cycle cylinders by electro osition of copper. My brother-in-law, o has a patent for making shell onator tubes, and who is at present command of a very prosperous concern, making experiments for me, and I oe in time to be able to let you know re about it.'

□ □ □

## IN THE ITALIAN RETREAT.

J. HAWORTH, who was in the retreat of the Italians, sends us the following interesting letter: have just arrived in England from



bles.

d roof having been taken off for r since the outbreak of war, which ght): Cpl. Art. Hadfield, G.; Cpl. G.; Cpl. Bould, A. Third row: k.

Italy, after twenty days of travelling. As soon as I arrived in this country the first paper I bought was *The Motor Cycle*, and the first article I read was about the two Englishmen in the retreat in Italy. The details are quite correct, except that there were four Englishmen instead of two, and I was one

of them. The other two were privates out of the last battery to leave the Carso front, and were pounding away at the Austrians until the last minute. We had a terrible time, and the reason we were left behind was that we expected cars to return to the English hospital and the batteries. At the last minute we set fire to everything, and got away as you say.

"I was attached to the Red Cross out there for eight months, and have been

his Triumph for hours amongst roads packed with soldiers and transports coming back to see if we were still marching on.

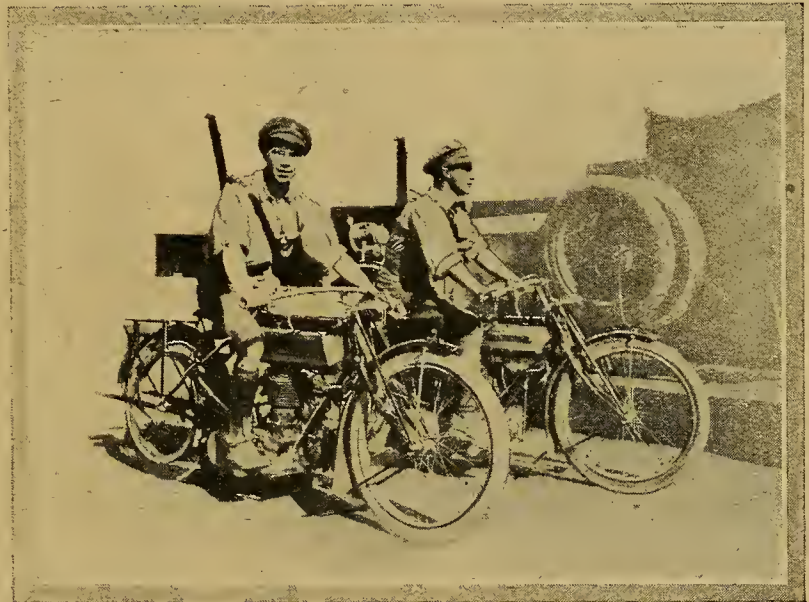
"Here's luck to the Triumphs, which did me wonderful service for six months without the least trouble."

□ □ □

## CONCERNING FORD CARS.

FROM Edric Eland, of the E.E.F., comes the following rejoinder to a letter that has appeared concerning the Ford cars in Egypt:

"In the 'Military Notes' feature of your interesting number dated October 4th there appears a communication from a correspondent, who states that 'Fords are the only things of any use out here.' I venture to suggest that your correspondent has quite overlooked the Crossley tenders and cars used by the Royal Flying Corps on this Front. Some of these vehicles have been doing splendid work on the Sinai desert and in Palestine for months past.



Cpl. Godsell (nearest the Rolls armoured car) and Gunner R. Fowlkes, of the L.A.M.B., in Palestine. They are mounted on W.D. Triumphs.

despatch riding with the one and only cycle—the Triumph. I was in hospital at the time of the evacuation, and had to walk from Palmanova to Latisana. Unfortunately, I lost the others at St. Georgio through going into a farmhouse for food and to rest my pains and fever. I was lucky to find one of our lorries at Latisana and get away as far as Mantua with only just what I stood in.

"I am glad to hear the others are safe, as I thought they had been captured. If anyone deserves the Military Medal it is the Corporal. I could give you the whole history of the retreat right from the Carso front as far as Mantua, but I have not the energy to write much yet."

"You say the motor cycle was put on the cart. This was not so, as the Corporal was our advance party. He rode on in front to pick out the roads. He was an untiring worker, and rode

"It should be borne in mind that the 'going' out here is, in the main, through heavy sand. Ford chassis equipped with a light box body are all very well for the rapid transit of *personnel* and light stores or baggage, but when it comes to the carriage of much dead weight, such as petrol, also engines, and the like, the R.F.C. Crossley vehicles score every time."

□ □ □

## "CUSHY" JOBS.

CPL. GLOVER, a D.R. who has seen hard service as D.R. in France, writes us an interesting letter on the subject of the deeds and daring of the various branches of the service, and says that any man who condemns the A.S.C., M.T., as "cushy" cannot have seen much of the "real business" at the Front, his statement referring, of course, to transports at the Front.



# NEW READING STANDARD MODELS.

Detailed Improvements of a Popular American Machine having a Capacity of 1,173 c.c.

THE new Reading Standard models seem to be designed more after British ideas than is usually the case with American motor cycles. This machine has not as yet obtained a great measure of popularity in this country, and we ourselves have had no practical experience of its capabilities, but, judging from its appearance, we should imagine that it could give points to many of the American machines on the market.

No very striking changes have been incorporated in next year's models, which

been redesigned so as to give a quicker discharge of the burnt gases, and the exhaust pipes are now 1½ in. diameter.

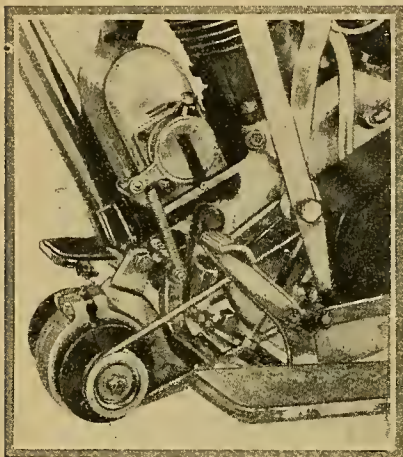
Mechanical lubrication is, of course, a feature of this machine, as on the majority of Yankee big twins, and there is also an auxiliary hand pump fitted to the oil tank, this latter, as will be seen, being fitted below the saddle. The actual introduction of lubricant into the engine is effected by the splash system, but, the oil lead from the mechanical oiler is introduced direct to the front cylinder. Ignition may be by either Bosch or Dixie magneto, as required; while in the case of the electrically equipped model, the Splittdorf generator, which does not replace the magneto, as in some American practice, is placed in the position most frequently occupied by the magneto in British machines. The drive is effected by a belt from the driving pulley of the engine, and may be clearly seen in one of the accompanying illustrations, which also shows the coupled hand and foot clutch control, this being a valuable feature that has become very popular in American motor cycle practice. The silencer is of rather an interesting type, in that it strikes one as being on the

inefficient side, when judged from appearances, and consequently noisy, but we are assured that in effect it is extremely efficient both as regards silence and the avoidance of back pressure. A cut-out is fitted as standard.

## Large Capacity Tanks.

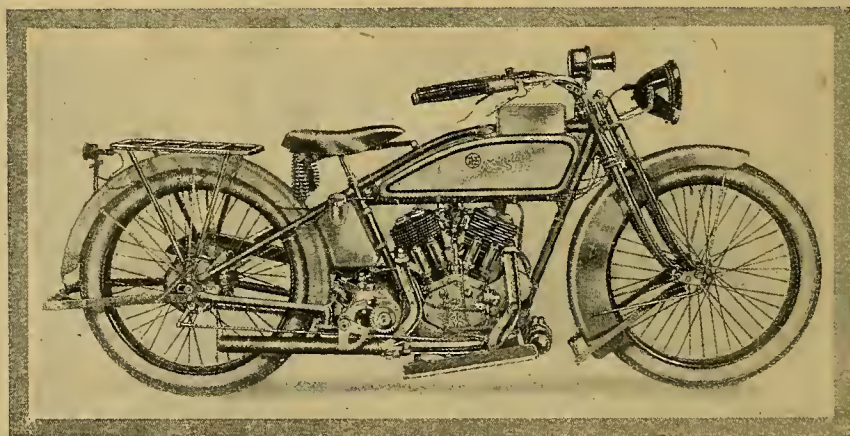
Many minor points of interest may be seen from an examination of the illustrations of this machine, and among them it will be noticed that the main tank, which is used for petrol exclusively, is of very ample proportions, and is, indeed, stated to be of four gallons capacity, i.e., about 3½ imperial gallons. The toolbox is mounted well forward on the top of the tank.

The general appearance of the machine is quite pleasing, and the finish is of military olive drab. As regards accessibility, this machine seems on a par with most other Americans, and it will be noticed that removal of the cylinders for decarbonising will be no simple matter. The ordinary type of countershaft three-speed gear box with kick starter is fitted, and the drive to rear wheel is by single chain protected by a simple overhead cover.



The Splittdorf generator on the electrically equipped model is placed in a very exposed position.

will number three—the Model 18T, a three-speed twin rated at 6 h.p.; Model 18TE, a similar machine with electrical equipment; and Model 18S, with three-speed gear and a single cylinder, rated at 6 h.p. The bore of each cylinder is 3½ in. (85.7 mm.) and the stroke 4 in. (101.6 mm.), giving a capacity of 1,173 c.c. In this year's models the casting of the cylinders has been altered somewhat so as to produce a heavier wall, but thinner and more uniform fins have been adopted; also the exhaust ports have



The latest three-speed electrically equipped Reading Standard. The capacity of the engine is 1,173 c.c.

## AN UNTAPPED SOURCE OF FUEL.

IN a paper recently presented before the Independent Oilmen's Association convention at Chicago, Mr. David T. Day, consulting petroleum expert of the Bureau of Mines, who has been employed for some time in investigating the possibilities of the shale deposits of the Eastern States, referred to the enormous shale beds of that country as possessing an almost inexhaustible supply of crude oil. An investigation based upon the most careful research of governing bodies resulted in the decision that in Colorado and Utah alone there is at present eight times as much oil as in all the oil fields of the United States at present working.

These, however, are by no means the only unexploited shale oil beds in North America. Western Pennsylvania, West

Virginia, Nevada, Texas, Oklahoma, and the Pacific Coast are rich in shale oil deposits, guaranteeing a supply of oil for all demands for many years to come.

In Scotland the shale oil beds have been worked for many years, the extracting of the fuel presenting no great difficulties, and this Caledonian supply has proved a great asset during the war; but in America there has hitherto been no real incentive to warrant the expenditure necessary for tapping these virgin supplies. Compared with the small outlay necessary for shallow sand drilling, the working of shale is a costly business; and so long as the petroleum oil supply has proved adequate, development in this direction has been uncalled for. But the petroleum supplies are no longer

adequate. This year showed a shortage of approximately 30,000,000 barrels, and this shortage, with the resulting stimulus of high prices, will undoubtedly result in the development of these supplies, which are simply waiting to be tapped; indeed, it cannot be otherwise.

As a fuel, the only real disadvantage of the shale oil is its permeating smell; but as to whether the lighter by-products of the oil would be distinguished in this way we are unable to say. Shale oil is extensively used in Scotland; and as a petrol substitute the semi-refined lamp oil variety gives better results than petroleum lamp oil. It is reassuring to note, therefore, that there is at present no danger of the world's supply of liquid hydrocarbon fuels giving out.



## TANKS IN THE GREAT BRITISH VICTORY.

Extracts from the War Correspondents' Despatches.

NEWSPAPERS print long accounts of the new offensive, under the heading, "Great British Victory," and all agree in assigning the chief honours of the day to the Tanks, the camouflaged attack, and the new British method of organising the offensive in secret.

The *Petit Parisien*, commenting on the news of the great British victory, says: "A stroke of unheard-of audacity, a veritable master stroke. The guns took up their position for action, but remained mute, while battalions of Tanks lined up, and the infantry was massed behind them. At the moment of attack, the Tanks aligned as though on parade, went forward, and quickly smashed through the wire defences protecting the first line trenches over which they strode. The Boches were swept off their feet, and the attack thus arrived at the Hindenburg line, reputed inaccessible and impregnable. Mitrailluses, mortars, and grenades now came into action, and the Tanks were fired upon at point-blank range, but the invulnerable trenches were violated at several points. The way was open, for a wide break had been made."

## How the Germans were Surprised. A Thrilling Adventure.

Mr. Phillip Gibbs in *The Daily Telegraph*:

"Some hundreds of prisoners have been taken, and most of them say that

the first thing they knew of the attack was when out of the mist they saw the Tanks advancing upon them, smashing down their wire, crawling over their trenches, and nosing forward with gun fire, and machine gun fire slashing from their sides."

## Miracle of the Tanks.

Mr. H. Percy Robinson in the *Daily News*:

"Next to the secrecy with which the attack has been planned, the great feature of the operation was the overwhelming share played in the earlier stages of the advance by the Tanks. The condition of the ground here, which is little cut up by shell-holes, and is dry, made their use possible, as it has not been possible of late in Flanders. His Majesty's landships have at last had a real opportunity, and they seem to have made magnificent use of it. It was the Tanks first duty to roll out that wire so that the infantry could get through, and they seem to have done it everywhere. The infantry poured through after them."

## General in a Tank.

Mr. A. B. Dewar in the *Daily Mail*:

"While I am touching on Tanks I may mention a few interesting facts about their work and the manner in which they went into action. There is something about the latter which has a

fine flavour of the old style of warfare. The General Commanding the Tank Corps himself led the attack. His Tank went over with flag flying. Clearly the time has passed for railleury, however well meant, at the cost of the Tanks. They must be taken gravely. We should contrive a fresh set of synonyms for Tanks after this battle. They have done this time all that was reasonably expected of them, and they have done a good bit more. 'This time, I think, sir, we have really done the trick,' I heard a Tank leader and inspirer say laughingly to his general (yesterday afternoon), and the claim cannot be disputed."

## "England expects —"

From the Press Association's Special Correspondent:

"The advance of the great army of Tanks to the attack was made especially dramatic by the General in Command, who went into battle himself in a Tank, sailing some two or three hundred yards ahead of the rest of the fleet. He flew a huge flag at the masthead, and report says he sent a truly Nelsonian message to all his commanders before going into action, viz., 'England expects that every Tank to-day will do its damndest.'"

"The Tanks made their passage through the notorious Hindenburg belts of barbed wire as if they were paper, and the infantry pressed through after them, with the result now known by all."

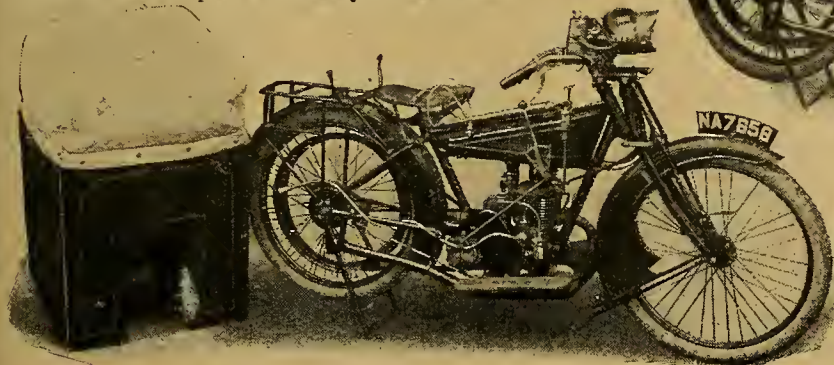
## TWELVE MILES FOR A PENNY.

A GAS-HOLDER designed specially for light-weight motor cycles, which should especially appeal to those motor cyclists who require to use their machines for going to and from business, is being manufactured by Messrs. John Knap and Son, Ltd., The Motor Depot, Burnley. The capacity is approximately 15 c.f., and on test a mileage of twelve was obtained. The container can be filled from the home meter at a cost of less than one penny.

It will be noted that the outfit is fitted to an Alldays Allon. No appreciable difference was noticeable in the running on petrol and on coal gas.

Special attention has been paid to the detaching of the container. The box can be removed in five seconds in case a repair is necessary to rear wheel

AN ALLDAYS-ALLON  
RUNNING  
ON COAL GAS.



A coal gas container specially designed  
for use on lightweights.

on tyre, the unscrewing of three wing nuts being all that is required. The weight complete is only 18 lb. The appearance is exceptionally neat, and it does not detract from the smartness of the machine.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

### LIQUID AIR AS A MOTOR CYCLE FUEL.

Sir,—May I appeal to your readers for some information on the application of liquid air as a fuel for motor cycles. I once read in a rather old book how a car had been run on liquid air with quite good results, but I have forgotten the title, and cannot procure the book again.

I am taking a great interest in the discussions of different fuels, being a regular reader of *The Motor Cycle*.

Dunfermline.

DUSTY.

### PETROL CONSUMPTION.

Sir,—I can corroborate Mr. Frank White's statement as to what can be done with  $3\frac{1}{2}$  h.p. machines in the matter of petrol consumption.

In 1908, riding a standard touring  $3\frac{1}{2}$  h.p. Triumph of that year, I did 198 m.p.g. in a competition organised by the Manchester Motor Club. In this competition, as in others, I used White's petrol economiser, then a very popular and useful fitment. I cannot recollect having seen anything of this in recent years.

C. E. KETTLE.

### SHORT-TIME PETROL LICENCES.

Sir,—In last week's issue of *The Motor Cycle* I notice that it is stated that the Petrol Controller's Department is granting short-time petrol licences to officers on leave from France or who are convalescent. Do you think it fair that this preference should be given to officers? What of the rank and file? [See page 516.—Ed.]

To take my own case for example. I have served as a D.R. to the Heavy Artillery in France, and had the misfortune to be "crooked" last June. I was then riding my third machine (all 4 h.p. Triumphs), having smashed one by riding into a W.D. lorry in the dark, and getting the other (and incidentally myself) badly damaged by a shell which arrived at a well-known fork road in front of Arras at the same time as ourselves.

I have been in bed four and a half months, and am now getting about again, and although the owner of a  $2\frac{3}{4}$  h.p. T.T. and a  $3\frac{1}{2}$  h.p. touring Douglas am unable to use them owing to the petrol regulations.

Surely we are as much entitled to enjoy a little pleasure from our own motor cycles as those who happen to hold the King's commission.

May I add that I am one more of your readers who used to receive regularly the Blue 'Un in France.

Hendon.

SERGEANT. H. OWITZER.

### INTERNAL COOLING.

Sir,—Your correspondent "H.A." in showing that "Engro" has got off the track, has, in my opinion, himself gone astray. Our object in designing internal combustion engines is to utilise to the utmost the expansive force of gases evolved from suitable combustibles, such as petrol, coal gas, etc.

The thermal efficiency, and therefore, to a considerable extent, the overall efficiency, is dependent on the range of temperature from the beginning of the stroke to the opening of the exhaust, which range bears a relationship to the ratio—compression volume to total volume at point of exhaust.

The more heat we can utilise by reduction of temperature of gases—by expansion—the greater the efficiency. We do not wish to radiate any heat from the cylinder and piston if our engine will work satisfactorily without, and if we could prevent the surfaces of the combustion chamber piston and cylinder from receiving heat we should, of course, require no fins for radiation. This brings us to the consideration of piston insulation as a first step; a modified application of

"Engro's" suggestion was referred to in my letter of October 25th. We shall not be able, however, to run the engine hotter, as we are generally limited by pre-ignition, which means that our fuel consumption must be reduced to keep the temperature down. The ratio of expansion and temperature range being as before, the power would remain approximately the same. A second step would be the insulation of the remaining surfaces of the combustion chamber, not by wrapping the *outside* of the cylinder as suggested by "H.A.," but by lining the *interior* in the same manner as the piston top to prevent the heat entering the metal.

Although this could not be carried out completely, the reduction in heat transmission through these surfaces would probably effect an appreciable reduction in the temperature of the exhaust valve seat and sparking plug by the more effective radiation of the remaining heat loss. This may possibly enable us to utilise a higher compression without risk of pre-ignition, and hence obtain higher power.

Probably a detachable form of head would be most suitable for such modifications to be tried, as this would facilitate machining the combustion chamber more completely.

JAMES F. JACKSON.

### WARM AND WATERPROOF GLOVES.

Sir,—My work lately has taken me daily across high exposed moorlands. After years of experience, I thought I knew all about weatherproof gear for motor cycling, but Dartmoor during the October gales has taught me how utterly inadequate is the protection still given by armchair designers to important things like plugs amongst many others.

True, a howling gale about the 1,000ft. line is not the daily fate of most motor cyclists, but had the lessons of the old London-Exeter rides been taken to heart, how much better should we have faced active service conditions the first year of war in France?

The so-called waterproof type of plug almost solved the short-circuiting nuisance, but added a fresh complication, in that the seatite of which it was made failed to insulate at the temperature my engine could easily attain uphill or against the wind. I could write a whole article on war-time seatite. Mica plugs have since behaved better.

But the chief trouble has been how to get a warm and waterproof glove. The so-called article supplied by audacious manufacturers, *via* trusting middlemen, has proved hopeless.

I have solved the problem, and for the sake of despatch riders, doctors, or other suffering fellow mortals give here the secret.

Procure good, roomy, wool-lined leather mitts. My own have a separate division for the first finger. Paint them over with a mixture of boiled linseed oil and "driers," such as is used for covering oilskins. The first coat should be plentiful and allowed to soak in well, particular attention being given to the seams. Several coats should be given, allowing each coat to dry before applying the next, until there is a glazed surface similar to that of an oilskin.

At first the mitts were a little stiff, but with the use they have become quite pliable. They can be placed for hours under water without letting in wet, and, what is more, they will stand wind-driven rain, and the rubbing grip of wet handle-bars, and keep bone dry inside.

An occasional coat of oil is necessary to keep them proof. Wind cuffs to gloves are useless unless they can be worn inside the oilskin. Worn outside, they simply serve to catch the water that runs down one's arms. Has any other reader had any success with any similar glove?

T. B. DIXON, M.R.C.S., L.R.C.P.



## INEFFICIENT SILENCERS.

Sir,—I see in *The Motor Cycle* of Nov. 15th that Sgt.-Maj. W. Ward, M.T., A.S.C., was summoned for riding a motor cycle (Triumph) with inefficient silencer. I myself live near Bromley, and was summoned for a similar offence last June. My machine was a standard 1914 Triumph, and had been ridden about London very considerably without complaint from the police. It was not a noisy machine. I was fined 10s. and, what was worse, my licence was endorsed. The police seem to make a special case of "cut-outs," as every week there are several cases at Bromley Police Court. Although I had been recently discharged from the Army, and was at the time unable to make far, it made no impression on the Bench. I have heard of dozens of motor cyclists in the district being summoned for a similar offence, and they are all fined, no matter what they have to say. I should like to make a strong protest against the action of the Bromley Bench.

AGGRIEVED.

St. Paul's Care.

## DISCARDING THE SPARK.

Sir,—In the article *re* discarding the spark in your issue of November 1st, I see no mention made of a fuel pump suitable to the type of engine in question. According to the description, the speed of the engine is to be governed by altering the size of the spray. Under these conditions, supposing the engine to be running at full speed with sprayer fully open, what is to become of the superfluous fuel when the sprayer is closed down a certain amount to obtain a slower speed?

May I venture to suggest a type of pump suitable for the engine, the principle of the pump being that employed in Diesel engines of the present time, and consisting of the following parts: A pump barrel A, in which a plunger B works. At the bottom of the barrel are two valves C and D, C being the discharge valve, and lightly spring loaded, while D is the suction valve. By means of suitable levers E and F, the valve D may be raised and kept off its seat for reasons explained later. K is the suction pipe from fuel tank, and L is discharge pipe to sprayer.

The action of the pump is as follows: Plunger B is lifted by means of an eccentric or other suitable contrivance, and oil is drawn in through the suction valve D. On the down stroke of the pump oil is forced through the non-return discharge valve C, through pipe L, to the sprayer.

Now, supposing all the oil is not needed, or, in other words, the engine is required to run more slowly, the suction valve D may be kept off its seat by means of the levers E and F, and some of the fuel will then return to the tank through the pipe K.

If the above type of pump be used, it would be advisable to have a sprayer with a fixed sized orifice, and regulate the speed of the engine by means of the suction valve D.

A valve cap H is fitted to enable the valve C to be fitted or removed. W. E. G. MARSHALL (ARTIFICER R.N.).

## A SPORTING CHALLENGE.

Sir,—In your issue of Nov. 15th is a letter over the initials "M.B., Ch.B.," in which the writer says he has "yet to find the W.D. Triumph that will stand a prolonged fast run solo without breaking an exhaust valve or drying up."

It seems to me that he bears an old-time prejudice against the Triumph, but in justice to the latter it does not seem fair to continue this against the present model.

We know that the valves bore the reputation of breaking when subjected to continual fast riding, but when I mention that on my pre-war model I broke ten valves in one year (during which I covered 25,000 miles), and that on my present W.D. model I have covered over 30,000 miles and have not had one valve break, I think you will agree that the Triumph Co. have overcome this old "weakness" and can rest on their present laurels. I might add that on every day I have ridden the present model I have always brought the maximum hand of my speedometer over the fifty, and am quite prepared to prove this to the satisfaction of "M.B., Ch.B."

A.H.F.

Brighton.

Sir,—In reply to the letter by "M.B., Ch.B.," in the issue of the 15th inst., I must say I utterly fail to agree with his remarks concerning a W.D. Triumph engine. For the past six months I have ridden a W.D. Triumph countershaft model every day without exception, and I have still to experience either drying up or broken valves, as he states. Further, I can take the machine out any time, and it will do any pace from five to fifty miles per hour at request, and if conditions would allow I would soon prove to him that there are several W.D. Triumphs that will stand a prolonged fast run and will not either dry up or break valves. Also I have a friend who was timed at sixty-three miles per hour over a one-mile stretch with one of these machines with a 5 to 1 gear, and this machine has been ridden by the same rider for the past two years, and he informs me that up to the present he has not had a valve break or suffered from drying up.

Sydenham. BOGEY, M.T., A.S.C.

Sir,—I should just like the space of a few lines to endorse "M.B., Ch.B.'s" letter in *The Motor Cycle* of November 15th. Although at present riding a very fast heavy combination, I am a very keen "single and sidecar" enthusiast. Now I do not in the least want to be misunderstood, but, like your correspondent, I, too, have ridden a very big number of W.D. Triumphs, and for an engine of that capacity, with all due respect to the makers, I fail to see anything at all nice in it, either from a smooth running, flexibility, or balance point of view, of course making full allowances for a low compression engine and war time conditions. Does not this go to prove that "Mr. Jones's" machine was not in the least a standard mount? Of course, we all agree that it was a good performance right through; perhaps would have been better but for the quibbling *re* sidecars, but we know that this sort of thing is usually inevitable in a match of this kind. Now to the other competitor. I know Mr. Brough well enough, and he knows me, and I wonder what he will say when I ask him a question as regards speed, and that is this: Is not the claim made by Messrs. Bayliss, Thomas and Co. just a little high? I always understood that for a standard 8 h.p. J.A.P. engine, side valve  $85\frac{1}{2} \times 85$  mm. (I understood this was the model used by Mr. Brough), a speed of anywhere near seventy on Brooklands was considered very good solo, but to put up these times with a countershaft gear and heavy sidecar, heavy, at any rate, compared with the usual racing type, takes some doing, at least that has always been my experience with that model engine. I say nothing about the 90 mm. bore or the overhead types. Anyway, I have got another sporting challenge which I hope either Mr. Brough or Messrs. Bayliss, Thomas may see fit to take up at some future date, and this time it is on equal terms as far as cubic capacities go. I will match my 1,000 c.c. machine, which is a standard list model as supplied to the public, viz., a short coupled K model Harley-Davidson, on two conditions, which are that the distance be not less than a 500 miles blind, and the average over the whole distance not under 45 m.p.h. (on Brooklands, of course, when it is available). This would be a duration test, would it not, and we should then see just how these engines did stick it? Of course, this applies to either the machine used or any other similar model they may build, if it is fitted with a standard J.A.P. engine. If I were unable at the time to take this on there are three of us boys all having this model who would be only too glad to have a sporting scrap with Mr. Brough's 8 h.p. standard  $85\frac{1}{2} \times 85$  mm.



At that I leave it with just a concluding note that I am surprised Mr. Brough did not have a shot with one of his  $3\frac{1}{2}$  T.T. flat twins which I remember riding "up North." Of course, the sum total of this letter is that I doubt two statements that have been made, viz., that the Triumph was standard, also that the engine Mr. Brough used as a standard fitted with all and sundry *touring* gadgets is capable of 70 m.p.h. or over on any ordinary road. It is some speed for a standard machine, irrespective of cubic capacity.

All this undoubtedly goes to improve the breed, and that is what we, who are really interested, strive for, although, as I said a few weeks ago, I absolutely disagree with all these claims of speed stunts on public highways as being very detrimental to our sport. BERT HOULDING.

#### FLYING FACTS AND THEORIES.

Sir,—I have read with great interest the articles by Mr. W. G. Aston, and also the answering letter from "O.J.F.S." Mr. Aston has given his critic the *coup de grâce* by his very clear and convincing arguments, but I fear that, by missing out a certain clause in his sentence, "O.J.F.S." did not express himself as he intended. I cannot help thinking he meant to say, "Every embryo pilot is impressed by his instructors with the danger of turning down wind close to the ground with a failing engine." Therein lies the danger, to which we will return later.

But, with all due respect to Mr. Aston, and the battery of letters he bears after his name, I am coming to the counter attack on "O.J.F.S.'s" behalf to criticise other statements made by your contributor.

He says that "When an aeroplane turns it requires more power from the engine if it is to maintain its altitude unchanged." That is an extraordinary theory to hold, and perhaps Mr. Aston will be able to defend it as ably as he defended his others, but I doubt it. On any modern machine no height whatever is lost on a turn, unless it is the fault of the pilot. As a matter of fact, it is perfectly easy to climb on a turn, without increasing the throttle opening in the least. One's thoughts fly to the air fighter, who is dodging and twisting all the time. His throttle is used quite a lot as it is, but on every turn . . . !

Further, Mr. Aston says that if a pilot, in making a bad turn, loses height to such an extent that he is brought to the ground, it is obviously desirable that he shall come to earth at the smallest possible land speed. Not necessarily. Machines often come to earth at no ground speed at all; I can call to mind two occasions on which this has occurred. On one of them the machine dived on its nose from some fifty feet, and on the other it sideslipped vertically from about the same height. Both came to earth at *no* land speed, but neither pilot seemed to consider it very desirable. Both were turning down wind with a failing engine, close to the ground.

In passing, the danger of the above lies in the fact that, with the engine off, a machine must lose height on a turn. The nose must be kept well down to maintain flying speed, and as there is generally insufficient height, the machine eventually returns to *terra firma* at no ground speed, immediately the turn is attempted.

F.M.C.H. (also Lt. R.F.C.)

Sir,—With amazement and delight have I been following the stony path in the wake of W. G. Aston, A.M.I.A.E. He is a brave man.

A year ago I was teaching men to fly. They were soaked with the theories against which your contributor is making such a brave stand. Who thus soaked them? Why, ground instructors, plus a few genuine air instructors—in their turn saturated with this false idea by men with fine co-ordination of brain and limb, but no reasoning powers.

Needless to say, Mr. Aston is correct. He is not a pilot, bad luck! I am. I will back him up in every statement which he has so far made (by the way, I do not know him from Adam).

It occurred to me, on reading his article in your issue of the 15th November, that he might have saved himself some trouble.

Search through the letter of "O.J.F.S." (for whom I blush as an R.F.C. pilot). Pick out a definite statement:

"It being obviously a slower business to lose a velocity of 20 m.p.h. in one direction, and gain one of 80 m.p.h. in the opposite direction, than to lose one of 80 m.p.h. and gain 20 m.p.h." (The man is mad.)

Refute it thus:

Precisely the same amount of energy over a given time is required (a) to give a stationary body a speed of 20 m.p.h. as is required (b) to bring that body to a standstill.

In this case, all the braking energy exerted by skin friction and head resistance (including lift) is counteracted by the engine, so may be ignored.

Therefore precisely the same amount of time is taken by a given amount of energy to accomplish (a) and (b).

Now refer to "O.J.F.S.'s" two examples.

Example 1.—(a) To lose speed of 20 m.p.h. and (b) gain speed of 80 m.p.h.; or,

Example 2.—(a) To gain speed of 20 m.p.h. and (b) lose speed of 80 m.p.h.

What is the difference? None.

Time required in (1) equals time required in (2).

Energy required in (1) equals energy required in (2).

"Bank" (decided by c.f.) in (1) equals "bank" (decided by c.f.) in (2).

Turning down wind (1) is identical with turning up wind (2).

"O.J.F.S." mentions momentum, "apparently forgotten by your contributor."

I shall now mention *inertia*, apparently forgotten by "O.J.F.S." Thus:

From inertia to momentum equals from that same momentum to inertia.

If "O.J.F.S." wants any more, as he probably will, for I am bad at explaining, I have what he wants.

J. H. GOTCH (Sec.-Lt. R.F.C.)

#### THE FOUR-CYLINDER MOTOR CYCLE.

Sir,—In *The Motor Cycle* of November 15th I note a letter from L.-Cpl. Reeve, and wish to thank him for his appreciation of my converted F.N. I quite agree with him, and think that a four-cylinder three-speed motor cycle of good design, and consequently low weight, with shaft-drive, and last, but not least, spring frame, is the machine of the future. Valve placing will largely depend on conditions. Side-by-side or T valves for silence, or overhead valves and camshaft for speed and silence, irrespective of cost, are, to my mind, the lines on which to work. Too much thought has been spent on engine design, and insufficient on frame, transmission, etc. It follows that with proper spring frames, owing to stresses on the frames being less or more evenly distributed, the weight could be less. What we do find, however, is very much the reverse. This will form interesting matter for discussion, and if more light were thrown on it by motor cycle manufacturers, I think the whole movement would greatly benefit. In last week's issue you show a form of tank construction by A.J.S. In my machine I use a similar one, which I made in November, 1916. I do not know whether this was before the A.J.S. or not, but for clean outside appearance and capacity it cannot be beaten. OLIVOS.

Aston, W.

#### EXHAUST POPPET VALVE DESIGN.

Sir,—With regard to "Engro's" suggestions for air-cooled exhaust valves, the following points occur to me. Designs Nos. 1, 3, 4, and 5. The extension on the top of these valves would increase the area exposed to the products of combustion, which, I should imagine, would cause these extensions to stick in their guides; also these extensions would be impossible to keep tight, as they are exposed to the pressure of the explosion. The guides of an orthodox valve are not. Also, how would this valve be lubricated. Regarding No. 2. I should think that the ball valve would be very liable to become stuck up by a piece of grit or carbon; and are ball valves reliable when subjected to such heat? No. 5, apart from the points raised above, seems to be the most satisfactory design; but why not operate it from above, and lead the exhaust pipe straight from under the valve head? This would save coring a bend and tappet guide in the cylinder casting; also straightening the exhaust, which is desirable, and avoiding some of the mass of metal around the cylinder head, which is inclined to cause distortion of the cylinder. I would suggest that if the push rod in the overhead valve gear were converted into a pull rod, it would save some weight, as it would only need to be about 10 gauge wire, and would not increase the number of working parts.

R. CUTLER.



# A RAMBLE WEST IN PENWITH

## Objects of Interest in the Land's End District.

I WOULD recommend anyone thinking of taking a trip through Cornwall to decide at the outset to cover that most interesting part of the county so famous for its coast scenery viz., the Penwith district. A line drawn from St. Ives Bay to St. Michael's Mount will have on its west the most striking spots in this corner of England. It is very hilly country, mostly moorland and barren, with the exception of that portion around Penzance which is so productive as more than to compensate for the barrenness of the remaining part. The verdure of Penzance is, of course, famous all over the British Isles, but it has to be seen to be appreciated. Semi-tropical vegetation flourishes both in its cultivated and natural condition. Arum lilies grow in the open, and garden violets are sent by the train load to London every day. West Penwith also includes many of the tin mines which made Cornwall so famous in days gone by, and amongst them is the Ding Dong mine, which is supposed to be the identical mine, visited by the Phœnicians in the days of old, which earned for these islands their first recorded name of Cassiterides, or tin islands. The county is,

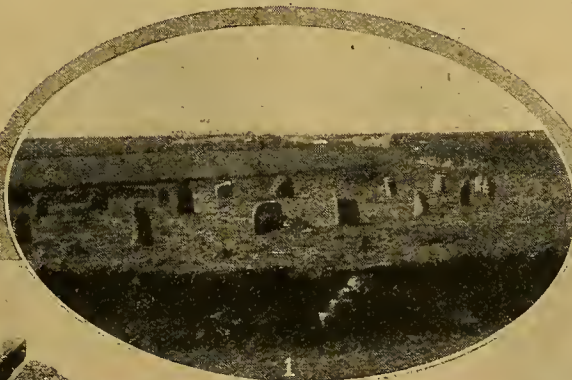


Lanyon Quoit. The capstone weighs twelve tons.

of course, anything but barren in other mineral wealth. Copper, lead, manganese, and silver are moderately plentiful, and some wolfram and radium have also been found.

As a centre for a tour round this district, Penzance cannot be beaten. A short tour, or really a decent run that is very hard to beat, is that from Penzance to St. Ives, and round by the coast road through Land's End and back to Penzance. Leaving Penzance at the Chyan-dour end, and turning to the left at Longloach we follow the main road until St. Erth station is reached. Here we take the left-hand fork which leads to St. Ives. A quarter of a mile along this road is another turning to the left, which in one and a half miles brings us to Tren Cromth, the highest point in this part. This point was roughly fortified by the Britons, but its main interest at the present time lies in the fine view it provides of the whole of the Cornish Riviera, including both the Northern and Southern coasts. A view from the top of this hill on a bright summer's day, embracing as it does both St. Ives and Michael's Mount, is one never to be forgotten.

Returning to the St. Ives road we pass through Lelant, where there are good golf links, and shortly afterwards arrive



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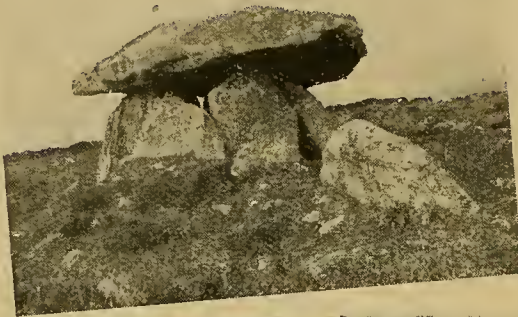
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(1) The "Merry Maidens" Druidical Circle. (2) Zennor Cromlech, the second largest in Cornwall. The capstone, the computed weight of which is sixty-five tons, has fallen. (3) A Cornish stile.





at St. Ives, which is perhaps too well-known to need any detailed description here. Quaint archways, narrow streets, and wonderful colouring make up a town of unique beauty, and one much loved by artists.

Leaving St. Ives we follow the main coast road to Land's End. The fine sea views on the right, and the rough rugged moorland scenery on the left, make a succession of beautiful pictures.

#### Cromlechs and Mines.

At Zennor the church should be visited for a glimpse at the quaintly carved "mermaid" bench, and Zennor Cromlech, the second in size in Cornwall, should not be missed. Immediately after Zennor, Gurnard's Head is passed—a rugged headland famous for the number of wrecks that have taken place on its rocks. At Morvah are some very interesting old mud huts, which are still in a fine state of preserva-



tion. Also near Morvah is the Chun Cromlech, which is unique in the fact that it has never fallen since it was originally erected some thousands of years ago. West Penwith is famous for its ancient Cornish-British monuments. Not the least interesting of these is a monument 1,500 years old bearing the vertical inscription Rialobran Cuhoval Fil. Rialobran, a famous chieftain, was the son of Cuhoval.

The Ding Dong mine already referred to is passed a little further along this road.

At Levant and Botallack are some prosperous tin mines, the workings of which extend some hundreds of yards under the sea.

Land's End, like St. Ives, has been so often described and illustrated that we will pass it by in our description, although if it is a first visit, some time, of course, should be spent there examining the fine rocks and perhaps buying some specimens which are



(1) Chun Cromlech, supposed to be 1,500 years old; the capstone is exactly the same as when first erected.

(2) Ancient Cornish-British mud hut at Morvah. These mud huts appear to be exactly as when last used.

(3) Date palms flourishing in Morrab Gardens at Penzance.

(4) Gurnard's Head, famous for wrecks.



**A Ramble in West Penwith.—**

on sale at the various portable booths that are generally to be seen there.

**The Logan Rock.**

Continuing on our route, we pass Tol-pedu-Penwith, where there is a wonderful cliff known as the "Chair Ladder." Close by (at Castle Treryn) is the famous Logan rock, a tremendous block of granite poised at the edge of the cliffs. Before 1824 this rock was thought to be fixed in its place so that it could not be upset, though it could be rocked to and fro with the little finger, but in that year a young naval lieutenant and his men moved it one day and it crashed down to the rocks below. Local indignation was so strongly aroused that the lieutenant had to replace the Logan rock, and as this weighed some sixty-five tons, the

punishment would surely meet the crime. The perfect balance of the rock, however, was destroyed forever and it no longer responds to a touch but must be pushed.

Lamorna is a very beautiful cove now chiefly frequented by artists, but in the olden days the majority of its *habitués* were smugglers. There is an ideal smugglers' cave and tunnel running from this cove to a little hill known as the Fogue, about a mile inland. From Lamorna we proceed direct to Penzance, passing through the village of Newlyn *en route*, which, like St. Ives, is a favourite artists' haunt at the present time. Newlyn being left behind, Penzance is soon reached, the total distance traversed having been forty-four miles—forty-four miles of perhaps the finest coast scenery of any part of the British Isles.

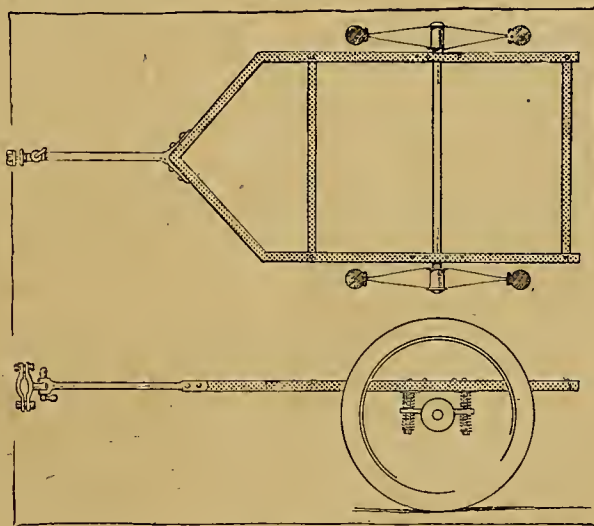
W.H.L.

## THE "GASTRAIL."

NOW that petrol is practically unobtainable several enterprising firms are turning their attention to the manufacture of devices for the carrying of gasbags, among them being Messrs. Henderson Sidecars, Fitzwilliam Street, Sheffield, who are marketing a trailer to be known as the "Gastrail." It boasts many unique features, some of which are embodied in the Henderson sidecars. For instance, the springing is the patent design, as used on the front of the Henderson Featherweight sidecars. The chassis, if it may be termed as such, is composed of very light angle steel, such as is used in the manufacture of luggage grids, and the attachment to the rear of the motor cycle is made by means of push pins, with a locking clip.

Any size of gasbag can be fitted to this trailer, as it is a very easy matter to lengthen the framework. The whole affair is well finished, and, complete with heavy tyres, sells at £7 7s.

It is obvious that only a limited number can be made owing to the restriction in supplies and difficulty in the labour market, so that any reader in need of such a fitment should apply at once.



THE "GASTRAIL."

A carrier for coal gas containers. It is manufactured by Messrs. Henderson Sidecars, Sheffield.

## A NEW TWO-SPEED GEAR.

"IXION" has repeatedly clamoured for a light two-speed gear, which he considers is required for two purposes—(a) for use on baby machines, and (b) on the T.T. roadster type of  $3\frac{1}{2}$  h.p. I am in a position to say that one of the leading designers has prepared such a gear for post-war issue. It is inadvisable at the moment to publish any close description, though full drawings are before me as I write. It will suffice to say that the gear, though novel, is on perfectly sound lines, can easily be incorporated into the layout of any ordinary machine, will lend itself to either a foot or hand change, is foolproof, possesses great durability, is equipped with a sturdy featherweight kick-starter, and is intended for belt-cum-chain drive.

After the war the gear will be put on the market as a "component," so that any firm manufacturing lightweights can incorporate it in their specification.

I should advise such manufacturers to keep it in mind, as it is designed by a deservedly famous engineer, and will be made by a firm whose trade-mark would sell anything. There is no need for any firm in search of such a gear to design one of their own, or to put up with pre-war makeshifts. I say this advisedly and with full responsibility.

Whether the gear will be made in a stronger form for the T.T.  $3\frac{1}{2}$  h.p. roadster would probably depend on the demand for it. I personally shall try the gear on a high-speed roadster, if a bigger model is not issued. I hope the gear makers will take their courage in their hands and chance this second market, as few of our speed merchants really love a single gear, whilst the alternative of burdening a speed iron with a cumbersome three-speed gear, heavy enough to stand rough usage with a sidecar attached, is absurd.

ROAD RIDER.



# QUESTIONS & REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## Belt Slip.

**?** I ride a  $3\frac{1}{2}$  h.p. Rudge-Multi, and my chief, or I might almost say my only, trouble is belt-slip. It is really very bad in wet weather, especially when I have to lower the gear, as then the engine pulley assumes small dimensions. It is at present fitted with a  $\frac{3}{4}$  in. Dunlop belt as supplied with the machine, but I am thinking of getting a new belt. Would you please advise me as to what make of belt, if any, would tend to overcome the slipping? Do you recommend a leather belt?—A.J.S.

The best plan is to use a good rubber belt in dry weather, and in wet weather use a well-dressed leather belt. We are afraid you are bound to experience a certain amount of slip in wet weather whatever the belt you use unless you run with the belt very tight.

## Overhauling a Magneto.

**?** I should be grateful if you would tell me how to take off and clean the magneto from my 1913  $3\frac{1}{2}$  h.p. three-speed Triumph motor cycle. I have experienced a pulling up sensation at all speeds, but not a dead stop. The petrol pipe is clear, the carburetter has been cleaned and examined, and the plug cleaned, but with little improvement.—F.F.

For the general cleaning of the magneto it is not necessary to remove it from the frame of the machine. Read up the subject of magnetos in "Motor Cycles and How to Manage Them," and you will then see that it is quite easy to remove the contact breaker. Place it in a saucer with a little petrol in it, and clean it with an old toothbrush. The next points which may require attention are the carbon brushes, which should be taken out and their rubbing surfaces lightly touched up with a magneto file. Next get a piece of clean rag soaked in petrol and wrap it round a piece of stick, and insert this through the orifice in which the high-tension brush holder screws, and press it against the collector ring, at the same time rotating the magneto. Before doing all this, however, you might see if the plug is sparking properly. If it is, while a little attention in the manner suggested will do no harm, it will be fairly evident that the magneto is in good order. The pulling-up sensation might be due to the carburetter flooding, air lock, water in petrol, too small or too large a jet, or dirt in the carburetter.

## Coal Gas.

**?** I have a 1914 4 h.p. Bradbury motor cycle, which I wish (if possible) to fit up to run on house gas, but I am such a novice I cannot see just where to connect the gas to carburetter. In your reply to "W.A.H.S." you say the float chamber is not necessary. Should the inlet be between the float chamber and jet? Is jet left or removed? My only idea is to remove jet and connect gas in its place.—T.W.L.

The most simple way to fit up your gas-pipe is to introduce it into the main air intake of the carburetter. There is no necessity to remove any of the carburetter fittings, such as the jet, float chamber, etc. Of course, if you prefer it, you may remove the jet and insert the gaspipe in the position previously occupied by it, but this is quite unnecessary.

## Overhauling the Engine.

**?** I have been doing some small repairs to my 1914  $3\frac{1}{2}$  h.p. P. and M. Finding that the big end of the connecting rod had worn a trifle, I have rebushed it. I managed to get the crank case off and have taken the flywheels apart. But in putting them together I find that the nut which holds them together goes round. This will mean taking the other half of the crank case off to hold the nut. There seems to be nothing to hold the crank case in position except the Hoffmann ball bearing race. Could you tell me how to get this off, as I cannot see any thread on the shaft? The half of the crank case I mean is the one to which the drain tap is attached on the chain side.—L.B.

You might tap off the ball bearing, and then place the flywheels on the bench, carefully line them up, and tighten up the nut on the crank pin. Be very careful to see that the flywheels are true. It would be almost best to mount the two main journals on dummy bearings, and then carefully test the flywheels for truth with the flat edge of an engineer's rule at several points around their circumference.

## Difficult Starting.

**?** I am having a lot of trouble in starting my motor cycle, an 8 h.p. Rex. Sometimes it takes me an hour to get a fire out of it. The magneto seems to give a good spark. I should be much obliged if you would tell me a few things which might cause hard starting.—A.B.C.

Some likely causes of difficult starting are as follow: Damp in the magneto contact breaker, preventing the rocker arm from making and breaking contact until the engine has been revolved for some considerable time, thus freeing the arm. The remedy is to free the tight bush by means of a little fine emery cloth wrapped round a match. We assume that you have carefully looked over the carburetter and ascertained that the jet is perfectly free, and that the throttle slides are working freely in the throttle barrel. A most frequent cause of difficult starting is the presence of air leaks in the induction system, which can be located by dripping oil over the suspected joints with the engine running, and if the oil is drawn in the leaks may be cured by wrapping the offending joint with insulation tape.

## IMPORTANT NOTICE.

### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

## Spring Frames.

**?** (1.) What are the disadvantages of riding a spring-framed machine, the springing mechanism of which does not ensure lateral rigidity? (2.) Which of the valve springs should be the stronger—inlet or exhaust? (3.) What is the best method of silencing tappet clatter? (4.) Does fitting a magneto cut-out switch have a bad effect on the engine if used frequently?—F.C.

(1.) If lateral rigidity were lacking, the machine would be liable to sideslip very badly in wet weather. (2.) Both should be fairly strong, but it is more important that the exhaust spring be of ample strength. (3.) There is practically no remedy for noisy tappet gears, as the fault is, generally speaking, in the design. (4.) No, provided the switch is used intelligently. It naturally does not do the engine any good to switch on suddenly when the throttle is half or fully open.



**The Advantage of a Large Belt.**

?

At present I have a  $\frac{1}{2}$  in. belt on my Triumph machine. I can easily fix a 1 in. belt, and it would fit all right. What are the benefits of fitting a larger belt?

Would my machine climb better—it has a fixed gear? Recently I went to South Wales, and on many a hill the engine would konk and stop.—R.E.J.

A 1 in. belt would be more satisfactory, as it would wear longer and would not be so likely to slip. It might, however, raise the gear, and this would probably accentuate your climbing troubles, which may further be due to excessive carbon deposit, causing pre-ignition and overheating.

**Overheating.**

?

On trying my motor cycle after reboresing the cylinder and fitting a new piston, I find it runs about threequarters of a mile, overheats, and stops. I have reduced the jet and find the engine still overheats. I can get the air lever just a shade in advance of the gas lever. I may say the piston is a fairly tight fit. I am also unable to get the engine to run slowly. (1.) Will the new piston cause the overheating? (2.) Will the trouble disappear as the engine gets run in? (3.) How far should the air lever be in advance of the throttle when I have got the right size jet? (4.) The crank case release has a ball in it. If I remove this, will it help to keep the crank case cool, as it gets very hot, or will it do any harm? (5.) How shall I get the engine to run slowly? —G.W.M.

(1-2.) The new piston might well cause the overheating of which you complain. The engine should be very generously lubricated, but, after having run about 200 miles, it should be well run in and the trouble gradually cease. (3.) It entirely depends upon the jet fitted and upon the adjustment of the Bowden controls. (4.) No, if you remove the ball you will lose a certain amount of oil from the crank case, and you will absorb power by pumping air in and out of the case. No advantage could be gained. (5.) The fact that the engine does not run slowly is probably due to your not

having screwed up the carburetter and induction pipe unions sufficiently tightly when reassembling the machine, and there are air leaks at these points.

**No Compression.**

?

(1.) My machine is a  $2\frac{1}{4}$  h.p. Calthorpe (1914) two-stroke. It somehow has lost all compression. When I ride it against a strong wind it will stop and not pull. I have had the cylinder off, and there is no deposit about it whatever. The rings are quite free in the grooves. When I ride it in top gear it will hardly take me along. Can you tell me what to do to put it right? (2.) Would the timing have anything to do with it? It is timed with the piston on top and points just opening.—G.R.

From the symptoms you describe it would appear that the engine has been run practically dry of lubricating oil, and as a result the inside of the cylinder has been badly scored, so that all compression is lost. Also the decompressor may require to be ground in. You do not say if you have had the cylinder off and examined it to see if there are any scoring or signs of damage caused by the piston working without the necessary film of oil. As regards the timing of the spark, this should occur when the piston is on top of the stroke and the contact breaker of magneto fully retarded. If the machine has not variable ignition, the points of the contact breaker should be just breaking when the piston is about  $\frac{1}{4}$  in. from the top of the compression stroke.

**READERS' REPLIES.****Overhauling an N.S.U. Gear.**

Referring to your correspondent's query on page 484, November 15th issue, re overhauling an N.S.U. gear, it does not appear to be generally known among users that with Triumph machines it is quite unnecessary to force the gear off the taper shaft with wedges behind the flange, the correct procedure being as follows: Unscrew the engine-shaft nut with the square-ended spanner provided, and continue to turn it until the flange of the nut comes up solidly against the

shoulder inside the gear; this can be felt. If the end of the spanner is then smartly tapped with a hammer, the gear should be pulled off the taper, and can be removed by finishing unscrewing the nut. This should be obvious to anyone who has used the old Triumph trick of removing a pulley with the aid of a penny in the cap nut. This method is applicable to any engine which has the thread on the crankshaft long enough to allow the nut to screw back sufficiently to bear against the shoulder in the gear before coming off the shaft.—ERIC CAUDWELL, A.M.I.A.E.

**Curious Mechanical Breakage.**

After two pistons had been broken in a motor cycle which I once owned, a crack which had apparently developed from a flaw was found in the small end of the connecting rod. The crack was so situated as not to be detected at a casual glance. It appears probable that it was responsible for the breakages described in your Queries and Replies page of 15th November.—J.M.

**RECOMMENDED ROUTES.****LEEDS TO KERNE BRIDGE.—A.R.**

Leeds, Doncaster, Tickhill, Worksop, Mansfield, Derby, Ashby-de-la-Zouch, Ilstock, Hinckley, Coventry, Kenilworth, Warwick, Stratford-on-Avon, Evesham, Tewkesbury, Ledbury, Ross, Kerne Bridge. Approximately 200 miles.

**STAFFORD TO RICHMOND (YORKS.).—F.T.**

Stafford, Weston, Uttoxeter, Derby, Heanor, Mansfield, Worksop, Doncaster, Ferrybridge, Aberford, Wetherby, Boroughbridge, Leeming Lane, Catterick, Richmond. Approximately 170 miles.

**COVENTRY TO NEATH.—A.T.D.**

Coventry, Kenilworth, Warwick, Stratford-on-Avon, Evesham, Tewkesbury, Gloucester, Newnham, Chepstow, Newport, Cardiff, Cowbridge, Bridgend, Neath. Approximately 155 miles.

**BROOKWOOD TO LEICESTER.—J.T.D.**

Brookwood, Bagshot, Ascot, Windsor, Slough, Beaconsfield, Amersham, Chessham, Tring, Dunstable, Hockliffe, Woburn, Newport Pagnell, Northampton, Husbands Bosworth, Leicester.

**THEIR MAJESTIES AT A TYRE FACTORY.**

Whilst on a tour in the West of England recently, the King and Queen paid a visit to the Avon Tyre Co.'s works at Melksham. The illustrations show Their Majesties watching the removal of a tyre from its core after the process of vulcanisation, and a view in the mechanical rubber shop.



### More Gasbags.

We are informed that the Embro Cycle and Motor Co., 21, Charlotte Street, Hull, are prepared to fit gasbags to motor cycles.

### The Parent Tyre Co., Ltd.

The directors announce the following dividends, payable on or before November 21st: Half-yearly dividends on the 5% preference and 8% ordinary shares to August 31st, 1917, and a dividend of 11% on the deferred shares for the year ended August 31st, 1917.

### Birmingham Corporation selects New Imperials.

The New Imperial Cycle Co., Ltd., have received an order from the Birmingham Corporation for New Imperial 8 h.p. sidecar models complete. This make was selected after test of a number of other makes of machines. This evidently shows that the Municipal Department of Birmingham, at all events, realises the value of the motor cycle for its work.

### British Motor Trade Representative for Australasia.

Messrs. Morris, Russell and Co., Ltd., 75, Curtain Road, London, E.C.2, are sending their representative, Mr. Thomas Grainger, to Australia, Tasmania, and New Zealand, in the interests of the British motor trade. They are the selling agents for all Surridge's patents, including the Holdtite patch, repair outfits, and solution. Mr. Grainger, we understand, will be calling upon all principal agents in those Colonies. Surridge Holdtite patches have been used in the Army with great success.

### The Johannesburg-Durban Sidecar Race.

Every attempt to smash the Johannesburg to Durban records for motor cycles, with sidecar attached, arouses a vast amount of interest in South Africa. All previous records have been broken by an Indian motor cycle fitted with Bates tyres. The race is a pretty stiff test of what tyres will stand, for the journey from Johannesburg to Durban is one of 421 miles, over the roughest of roads, among mountains and rivers—a trip which the fastest train on the route takes 23h. 22m. to do. This is not the first time that Messrs. W. and A. Bates, of Leicester, have received information that this race has been won on their tyres.

### New Addresses.

Messrs. W. Petrie and Co., Ltd., makers of Fibrax brake blocks for motor cycles, 5, St. Stephen's House, Victoria Embankment, Westminster, London, S.W., have had their offices requisitioned by the Food Controller, and have therefore now removed to 2, Tudor Street, London, E.C.4.

The Coventry Premier, Ltd., owing to the expiration of their twenty-one years' lease, have given up their old premises at 20, Holborn Viaduct, London, E.C.1, and have taken a smaller office and showroom in the same buildings. They have also taken a separate repair depot at 18, King's Mews, Theobald's Road, London, W.C.1, where they can undertake to repair and thoroughly overhaul any make of motor cycle, first-class mechanics only being employed.



### Spare Parts.

Messrs. Maude's Motor Mart, 136, Great Portland Street, London, W.1, inform us that they are proposing to strip several machines which they cannot overhaul owing to lack of skilled labour, and offer their parts for sale. The machines in question will be of makes for which it is at present impossible to obtain spare parts. It is the intention of Messrs. Maude's Motor Mart to offer all the parts at makers' current list prices plus 50% (to compensate them for their trouble), and they will send all parts on approval. Since they anticipate a considerable number of enquiries they wish to make it known that no replies will be made to letters asking for parts which they are unable to supply.

### A New Homeland Publication.

"Our Homeland Cathedrals," the Homeland Association, Ltd., 37 and 38, Maiden Lane, London, W.C.2, in two volumes, 3s. per volume. When the war is finished there will be a great revival in motor cycle touring, and considerable pleasure can be obtained in reading such publications as those under review before contemplating a post-war tour. These books are offered as a plea for an awakening interest in the priceless examples of architecture which are to be found in our English and Welsh cathedrals. The books are written so as to be intelligible to the general public as well as to the student in architecture. They contain forty-two plans, and there are more than 100 illustrations.



A group of D.R.'s somewhere in France all of them having seen long service. Sgt. Jacobs (centre), who sent us the photograph, inscribed upon it the following amusing comment: "We don't get much money, but we do see life."

### The Chemico Body Shield.

There will be scores of people seeking to find some suitable Christmas present to send out to fighting men in the trenches, and among the most useful of things would be a "Chemico" body shield. Being made of fabric, it is worn as a garment, and affords warmth as well as security. The makers are the County Chemical Co., Ltd., Bradford Street, Birmingham.

### A Disclaimer.

Douglas C. Lamb writes: "We have a depot at 50, High Road, Wood Green, and a great deal of confusion is caused owing to the fact that there are other individuals in Wood Green of the same name, and we beg to say that we have not the slightest business or financial connection with them whatever. The proprietor of 50, High Road, Wood Green, and 151, High Street, Walthamstow, is Douglas C. Lamb."

### Advance in Price.

The Cycle Necessities Manufacturing Co., Vine Street, Birmingham, inform us that they have had to advance the price of their various mudguards and other accessories 25%, owing to the increased cost of materials. The company is very busy at the present time manufacturing side shields for front and rear mudguards, mud stops, and similar mudguarding inventions, which are, of course, in great demand among motor cyclists during the present season of the year.

### M-L Magnetos.

After the war it is the intention of the M-L Magneto Syndicate, Ltd., Coventry, to specialise on a complete range of motor cycle types, together with a magneto specially designed for four and six-cylinder light car work.

These magnetos will embody many improvements that have been suggested by the experience gained in the production of magnetos for the Air Services. Many of these improvements involve radical changes in design, but the result is a remarkably simple instrument of considerably increased efficiency and greatly reduced weight.

The firm state that they can now produce a magneto which, although only two-thirds the weight of pre-war standard models, has greatly increased efficiency and sparks at much lower speeds.

### American Firms and the War Loan.

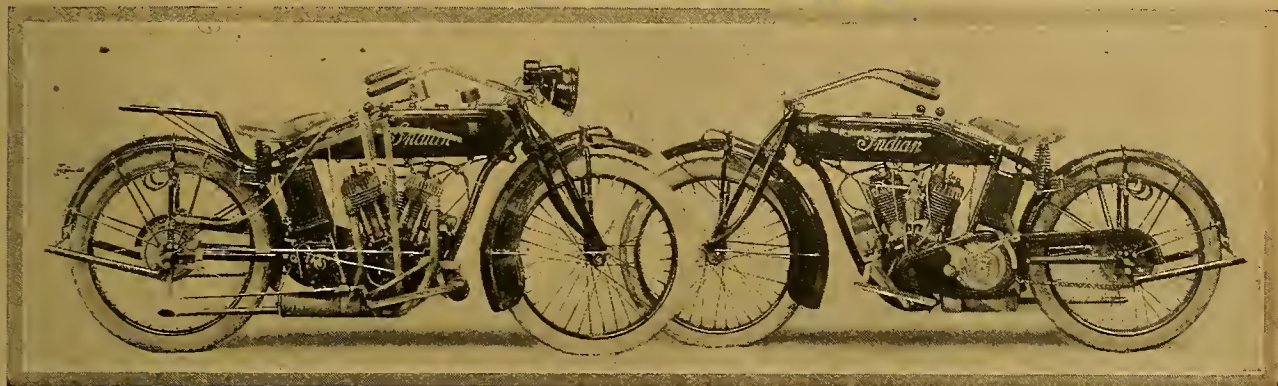
We have received a small booklet entitled "The Quieterion," which is one of a series published monthly by the Hyatt Roller Bearing Company, Detroit. In it there is nothing in reference to the famous roller bearing for which this firm is responsible, but it contains a most eloquent appeal to the American to do all he can for the war, and to subscribe to the Liberty Loan.

We do not remember anything similar having emanated from any British business house during the war, and think that those who are fortunate enough to receive a copy of this booklet would do well to consider whether the example of the Hyatt Roller Bearing Co. would not be worth following.



1918  
Powerplus

# Indian Motorcycles



Which we trust will be Post-War Models.

We regret that we are not in a position to supply motorcycles or send out catalogues at the present time, but when we are able to do so we will freely advertise the fact. This applies to Great Britain only.



**HENDEE MANUFACTURING CO.,**

"Indian House," 366-368, Euston Road, London, N.W.

Telephone: Museum 1643.

Telegrams: "Hendian, Euston, London."

AUSTRALIA, 109-113, Russell St., Melbourne.

CANADIAN WORKS, 12-14, Mercer St., Toronto.

AFRICA, Indian House, 127-9, Commissioner

Street, Johannesburg.

Indian House, 579, West Street, Durban.

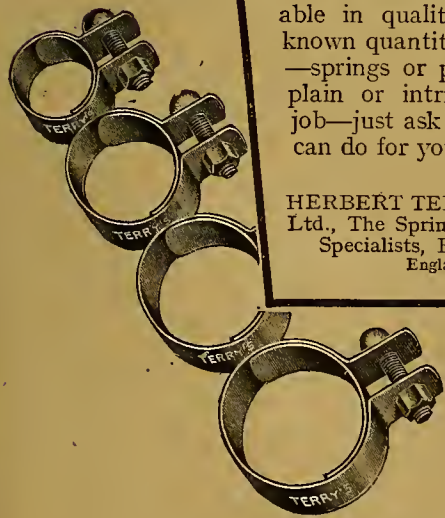
Indian House, Strand Street, Port Elizabeth.



## TERRY

—high-grade workmanship  
—to YOUR details—reliable in quality—in any known quantity.  
—springs or presswork—plain or intricate—any job—just ask us what we can do for you.

HERBERT TERRY & SONS,  
Ltd., The Spring & Presswork  
Specialists, REDDITCH,  
England.



THE varied uses and adaptations of Bowden Wire mechanism are recognised by almost every department of State Service. The work which we have in hand for Home and Allied Governments precludes, for the present, our acceptance of private orders.

Established 1897.

# Bowden Wire Ltd.

LONDON

VICTORIA ROAD  
WILLESDEN JUNCTION, N.W.10

Godbolds.

In answering these advertisements it is desirable to mention "The Motor Cycle."



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd., and crossed** & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**A** BINGDON, 3 1/2 h.p., 1914, Bosch mag., pan saddle, adjustable pulley: £27/19; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9072]

**A** BINGDON, 3 1/2 h.p., late 1910, N.S.U. 2 speeds, free engine, Bosch mag., excellent condition; £20, or best offer.—Whalley, Port St. Read, near Blackburn. [X8985]

### A.J.S.

**A** J.S. Spares: prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X9688]

**A** J.S., 1916, 6 h.p. solo, equal to new; £74.—H. J. Marston, 50, Argyle St., Birkenhead. [X1637]

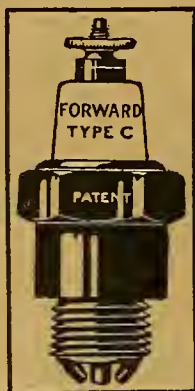
**A** J.S., 6 h.p., and sidecar, one of the last 1915 models turned out; price only 80 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [X9531]

**A** J.S., 2-speed, clutch, and K.S., aluminium foot-boards: £37/15; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9073]

**A** J.S., 1916, 4 h.p., 3-speed, clutch, kick start, perfect; £50; owner joining up.—McManus, Northumberland St., Workington, Cumberland. [X8989]

**A** J.S., 1916, 2 1/2 h.p., 3-speed gear, hand clutch, kick starter, etc., new condition, very little used; £50.—Pridgeon, North Somercotes Lincolnshire. [X8938]

**A** J.S. 1913 6 h.p. Combination, all accessories, overhauled by makers this year; £60, or nearest offer.—H. J. Marston, 50, Argyle St., Birkenhead. [X1636]



## It's in the Plug

to help or to hinder.

You may have experienced the one that hinders (most people have), but—have you knowledge of the one that helps—to wit the

## FORWARD

If you have, plugs to you are "out of sight and mind," but if you haven't—take the first step to acquire that knowledge and the service of the plug that will "help" all the time, and—Write for details now.

## FORWARD MOTOR CO.

35, Forward Works,  
Summer Row,  
Birmingham.

THE JOURNAL OF ECONOMICAL  
MOTORING FOR MEN AND WOMEN.

The  
**LIGHT CAR**

EVERY WEDNESDAY. ONE PENNY.

## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**1916** 6 h.p. A.J.S. Combination, lavishly equipped; £85.—George Newnham and Co., 307, Euston Rd., London. 'Phone: Museum 1568 and 1569. [X1574]

**A** J.S. Motor Cycles: immediate delivery of special 1917 model, complete, detachable wheels, 700x80 tyres; £21/6.—P. J. Evans, 87-91, John Bright St. Sole agent for Birmingham and district. [X8686]

**A** J.S., 2 1/2 h.p., 1914, 3-speed, clutch, T.T. bars, head lamps, generator, rear lamp, tools, sound tyres, machine perfect throughout; £40.—Advertiser, 156, St. Portland St., W.1. [X1109]

**RIDER** TROWARD and Co., 31 and 78, High St., Hampstead.—1916 A.J.S. de luxe combination, 6 h.p., 3-speed, detachable wheels and spare, Gloria sidecar, hood, screen, 3 lamps, etc.; 105 gns. (D) [X1546]

**A** J.S. 6 h.p. Combination, sidecar has wind screen, hood, and luggage grid, a good machine, in good condition, purchased in 1916, and has done nothing for 6 months; price £95, no offers.—Address, Dolphinholme, Walkden, Manchester. [X1594]

**A** J.S. Motor Cycles.—Immediate delivery of special 1917 model, complete, detachable wheels, 700x80 tyres; £21/6.—P. J. Evans, Sole Birmingham Agent, 87-91, John Bright St., Birmingham. [X1275]

### Alldays.

**ALLON**, 1915, 2-stroke; £20.—H. J. Marston, 50, Argyle St., Birkenhead. [X1638]

**1918** Allon, 2 1/2 h.p., first-class condition; £32.—Savage, 3, Church Circle, S. Farnborough, Hants. [X9123]

**ALLON**, 2-speed, £29/10; also all new models; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9075]

**ALLDAYS** Matchless, 2 1/2 h.p., 3-speed; £24, or nearest offer.—H. J. Marston, 50, Argyle St., Birkenhead. [X1639]

**ALLDAYS** Matchless, 1912, 3 1/2 h.p., 2-speed, handle start, Bosch mag., Dunlop tyres, in good running order; £20.—204, Beoley Rd., Redditch. [X8490]

**ALLON** (new), 2 1/2 h.p., 2-stroke, all models in stock for immediate delivery; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [X1759]

### Ariel.

**CROW** Bros., Guildford.—Ariel, latest 3 1/2 h.p., 3-speed countershaft models in stock. [X1048]

**ARIEL**, 1913, 3 1/2 h.p., 3-speed, clutch, and accessories, a Millford family sidecar, good order; £29.—Welfare, 21, Barnmoth Rd., Wandsworth. [X1713]

**ARIEL**, 1913, T.T. B. and B. carburettor, Bosch waterproof mag., lamps, horn, toolbar, belt, etc., perfect running order; £22.—Wilkinson, Basingstoke, Cambs. [X8936]

**ARIEL**, 5-h.p., 3-speed and clutch, C.B. sidecar, hood, screen, Lucas lamps, Cowey speedometer; £66; E.P. or exchange; all new models supplied.—Service Co., 292, High Holborn, W.C.1. [X9083]

**ARIEL** (new), 3 1/2 h.p., 3-speed countershaft gear, clutch, and kick-starter, decompressor, patent spring seat pillar; £72; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [X1760]

### Bat.

**GENUINE** Sacrifice.—1914 4 h.p. T.T. Bat-Jap, 2-speed, hand clutch, Bosch, good tyres; first offer £19/10.—St. Heliers, 18, Gower Rd., Peckham. [X1678]



## MOTOR CYCLES FOR SALE.

## Bat.

**BAT-J.A.P.**, 1915, 6h.p. and coachbuilt sidecar, lined throughout real pigskin, now in course of being completely overhauled and enamelled; may be thoroughly examined before being reassembled; what offers?—Seal, The Bays, Norwich Rd., Reepham, Norfolk. [1597]

## Bradbury.

**24h.p. Bradbury**, nice condition, requires dry battery; £7.-80, Bishop Rd., Southport. [X8997a]

**BRADBURY**, 4h.p., 3-speed; £25; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9070a]

**BRADBURY**, 4h.p., 2-speed, suitable for good hard service.—Full particulars from Sansom, Paignton. [X9112]

**1914 Bradbury**, 4h.p., N.S.U. gear, 1916 coachbuilt Coronet sidecar, been carefully used, and as new; 59 gns.—Parker, 40, High St., Oakham. [1569]

**1913 4h.p. Bradbury**, frame and tank re-enamelled, engine overhauled, good tyres, weatherproof Bosch, all as new; £13.—Glass, 147, White Hart Lane, Barnes. [1695]

**4h.p. Bradbury**, 2-speed countershaft, kick starter, overhauled and enamelled by Bradbury's, new heavy Dunlops, little used since, coachbuilt sidecar; £30.—N. Clifton, Knockholt. [X9024]

**RIDER TROWARD and Co.**, 31 and 78, High St., Hampstead.—1914 Bradbury, countershaft gears, clutch, kick start, 29 gns.; with coach sidecar, 35 gns.; 1913 Bradbury, 2-speed, and sidecar, 25 gns.; 1913 T.T. Bradbury, good order, 21 gns. (D) [1750]

## Brough.

**BROUGH**, 1917, Sturmer countershaft, Model H, new condition; cash, or exchange offers.—Atterbury, Fern Cottage, Normanton, Derby. [X9098]

**BROUGH** 1915, horizontal twin, 3½h.p., only run 600 miles, Lucas lamps, etc., like new; sacrifice £38.—King, Chemist, Sutton, Surrey. 'Phone: 646. [1693]

## Brown.

**BROWN**, 4h.p., 2-speed, free engine, with new G.B. sidecar, lamps, tyres, etc., all in good condition; £25.—S.J., 10, Lansdowne Rd., Seven Kings, Essex. [1660]

**3½h.p. Brown**, Bosch mag., B. and B. spring forks, 32 good tyres, engine lately overhauled, splendid order throughout; bargain, £14/10.—Box L5,149, c/o The Motor Cycle. [1743]

## B.S.A.

**B.S.A.** 1915 Combination; £55; in perfect condition.

**B.S.A.** 1916 Combination; £60.—Percy and Co., 337, Euston Rd., London. [1564]

**B.S.A.**, 3½h.p., 2-speed; £35, or nearest offer.—H. J. Marston, 50, Argyle St., Birkenhead. [1641]

**B.S.A.**, 1915, 4½h.p., absolutely perfect condition, very little used; £45.—Box L5,147, c/o The Motor Cycle. [1740]

**LATE 1915 B.S.A.**, 4½h.p., Montgomery sidecar, 3-speed countershaft, new condition; £55, near offers.—Gubbin, Bude, Cornwall. [1732]

**1914 Tourist Trophy B.S.A.**, very good condition, tyres nearly new, just overhauled; bargain, £50.—Sellers, Castle Rd., Keighley. [X9121]

**B.S.A. Combination**, 1914, countershaft 3-speed, fully equipped, new condition; 45 gns.—Kington, 223b, Hammersmith Rd., London, W. [1430]

**1917 B.S.A.**, Model H, coach sidecar, and accessories, all as new, £72; appointment.—Bartenshaw, 129, Nimbledon Park Rd., Southfields, S.W.18. [1604]

**1915 B.S.A. Combination**, Model H, with B.S.A. sidecar, 3 speeds, kick starter, Stewart speedometer, Lucas horn, etc., all in first-class order; £55.—Metcalfe, Auctioneer, Stockton. [X8831]

**4½h.p. B.S.A. Combination**, Model K, No. 2 sidecar, Palmer cords, Lucas lamp set, speedometer, bought new October, 1915, in splendid condition; £60.—Wilson, Haxey, near Doncaster. [X9026]

**RIDER TROWARD and Co.**, 31 and 78, High St., Hampstead.—1917 B.S.A., unsoiled, 59 gns.; 1916 B.S.A., with No. 1 sidecar and wind screen, 65 gns.; 1916 B.S.A., with Phoenix sidecar, 62 gns.; 1915 B.S.A., underslung coach sidecar, hood, screen, 52 gns.; all the above are 3-speed countershaft; 1913 B.S.A., 3½h.p., 3-speed, 29 gns.; 1913 B.S.A., 2-speed, wants attention, 19 gns. (D) [1751]

## Calthorpe.

**CALTHORPE-J.A.P.**, 1917, 2-speed; £30, or nearest offer.—H. J. Marston, 50, Argyle St., Birkenhead. [1640]

**1916 2½h.p. Calthorpe-Jap**, 2-speed, good condition; £25, or reasonable offer.—Turner, Narborough, Leicestershire. [X9013]

**CALTHORPE-J.A.P.**, 1915, 2-speed Enfield gear, Stewart speedometer, Lucas horn, etc., good condition; £24/10.—Box L5,134, c/o The Motor Cycle. [1593]

## Campion.

**CAMPION**, 1917, 8h.p. J.A.P., 4 speeds, Jardine gear box, combination fully equipped, cost £139, not run 1,000 miles; £85.—Percy and Co., 337, Euston Rd., London. [1558]

## SPARE PARTS

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## MOTOR CYCLES FOR SALE.

## Chater-Lea-Jap.

**1912-13 8h.p. Chater-Lea and S.C.** for sale, J.A.P. engines, 3 speeds, handle start, all chain driven; 50 gns.; go anywhere, splendid condition.—2, Belenden Rd., Peckham, S.E. [1566]

## Clyno.

**CLYNO Combination**, 2-speed, 5-6h.p., spare 2-speed gear, 2 spare covers (one new), 6 spare tubes, large quantity of tools, spares, etc.; £45.—Whitlock, 28, Brook St., W. [1487]

**CLYNO** 6h.p. Combination, 2-seater, screen, hood, storm sides, speedometer, etc., spare chains, tyres, perfect condition; £60.—Thomas, 32, Ormiston Rd., Shepherd's Bush. [1699]

**CLYNO 1913-14 Combination**, 5-6h.p., 3-speed, spare wheel, lamp set, Cowey speedometer, horn, etc., price £59/10; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9065]

**CLYNO War Office Combination**, 5-6h.p., new January, 1917, excellent condition; owner now using car instead; £80, or might consider T.T. Douglas in part payment.—Stephenson, Brinkburne, Darley Greo., Knowla, near Birmingham. [1736]

## Connaught.

**CONNAUGHT**, 2½h.p., 1916, 2-stroke, complete with head lamp, generator, rear lamp, horn, etc., only done small mileage; £26.—Mebes and Mebes, 156, Gt. Portland St., W. [1535]

## Coventry Eagle.

**COVENTRY Eagle**, 2½h.p. Villiers 2-stroke engine, 2-speed countershaft gear, Brampton forks, Dunlop non-skid tyres; £42; offered on behalf of owner; absolutely unused.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1763]

## Douglas.

**I CAN Supply You with a 1917 Douglas**—J. Gourlay, Fallowfield, Manchester. [9858]

**DOUGLAS**, 1914, 1915, 1916 in stock, many others.—Giiffin's, 89, Gt. Portland St., W.1. [9964]

**DOUGLAS**—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

**13 Douglas**, Amac, new tyre, speedometer, lamps; £19.—Robinson, Sandy, Bedfordshire. [1766]

**1914 Douglas**, 2-speed, new condition; bargain, £28/10.—Fribbin, 70, Pine Rd., Cricklewood. [1691]

**DOUGLAS**, 1914, 2-speed, magnificent condition; 33 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [0927]

**DOUGLAS**, 1914, 2-speed, new tyres, in perfect condition; accept £35.—Elms, 179, Brixton Rd., S.W.9. [1588]

**£26—1913 Clutch Douglas**, Binks, Lucas, X'Fall, sound order.—Rev. Thomas, Hartlebury, Kidderminster. [1679]

**DOUGLAS**; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

**DOUGLAS (Kent)**, 1915, 2½h.p., 2-speed, kick starter, lamp, horn, etc., just overhauled; 40 gns.—Box L5,145, c/o The Motor Cycle. [1738]

**1915 Douglas**, little used, splendid condition, head lamp, horn, accessories, tyres practically new; £40, or offer.—At Crawley's Garage, Bedford. [X9106]

**1912 Douglas**, speedometer, mechanical horn, all good condition; £30.—Blake, Portland Court Garage, Gt. Portland St., W.1. 'Phone: Mayfair 1527. [1682]

**DOUGLAS**, 1914, 2½h.p., very little used, splendid condition, new tyres; any severe trial; £32, no offers.—R. Fairley, Isle of Grain, near Rochester. [1715]

**DOUGLAS**, 1913, 2-speed, new pistons and rebushed, speedometer, lamps, and spares, splendid condition; £29/10.—Judge, Edgworth Rd., Sudbury, Suffolk. [1733]

**2½h.p. 1914 T.T. Douglas**, overhauled, Palmer tyres, £4 practically new, only 600 miles; best offer; on view R. O. Clark, road opposite G.P.O., Norwich. [1596]

**DOUGLAS**, 1916, 2½h.p., 2-speed, Lucas lighting set, speedometer, all accessories, and spares, as new; £50.—Hetherington, The Beeches, Wigton, Cumberland. [X9049]

**DOUGLAS**, 1913, 2-speed, Bosch mag., £35/10; 1911 2½h.p., with lamp and tools, £16/10; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9080]

**DOUGLAS**, late 1915, 2½h.p., 3-speed, T.T., complete with accessories, faultless condition throughout; £46.—Lieut. Lawlings, Coudson, King Charles Rd., Surbiton. [1688]

**DOUGLAS**, late 1915, 2½h.p., 3-speed, T.T. model, recently overhauled, accessories; £40; can be seen by appointment.—Levet, 16, Old Park Av., Balham, S.W. [X9105]

**DOUGLAS**, 1915, 2½h.p., T.T. model, fitted extra heavy Palmer tyres, all accessories, perfect condition throughout, very fast; £35.—Child, 22, Downs Rd., Luton. [1714]

**DOUGLAS**, 2½h.p., 1913-14, 2-speed, clutch, kick starter, Lucas lamps, generator, excellent condition, unused last 18 months; £37.—Summers, St. Lores, Bedford. [1729]



## MOTOR CYCLES FOR SALE.

## Douglas.

**T.T. Douglas**, late 1913, sporting model, 2-speed, long exhaust, unused last 2 years; best offer over £20.—Cox, 120, Marlborough Flats, Walton St., S.W.3. [1694]

**DOUGLAS**, 2½h.p., 1915, Colonial Model, 2 speeds, electric lighting, good tyres, in good condition throughout, fully equipped; £45.—Mehes and Mehes, 156, Gt. Portland St., W. [1537]

**DOUGLAS**, 2½h.p., late 1915, T.T., 2-speed, under 2,000 miles, guaranteed perfect condition, fully equipped; £45; must sell; private.—W. Ayers, Garage, Kensington Palace, W.8. [1628]

**DOUGLAS Motor Cycles**—We can deliver 1917 Model W on receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol (Wholesale and retail.) [1923]

**DOUGLAS**, 2½h.p., 1914, 2-speed, kick start, clutch, lamps, speedometer, 1917 Amac engine just overhauled, excellent condition; £35.—Lockyer, Dalebury, Sherwood Park Rd., Sutton. [1731]

**DOUGLAS**, 2½h.p., 1915 Colonial Model, T.T. bars, lamps, Stewart speedometer, Junior long horn, long exhaust, done 55 on the track; £38; Surrey.—Box L5,142, c/o The Motor Cycle. [1648]

**DOUGLAS**, 1912, 1919/10, 1913, 1931/10, 1915, £45; prompt delivery of new 1917 models to doctors, farmers, etc., against Ministry of Munitions permit.—Motor Exchange, Horton St., Hudders. [1620]

**DOUGLAS**, 2½h.p., 1915, 3-speed model, lamp, generator, horn, speedometer, tools, in splendid mechanical condition; £45; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1762]

**DOUGLAS**, sporting model, late 1914, 2½h.p. T.T., 2-speed, disc wheels, long exhaust, fully equipped, Stewart signal, tyres nearly new; best offer over £30; take National cash register part payment.—E., 23, Market Place, Kingston, S.W. [1614]

**1916 W.D. Douglas**, 2½h.p., 2-speed, machine carefully used and unspratched, tyres as new; can guarantee whole machine in perfect condition throughout, splendid bike; £45; or consider exchange, P. and M. preferable.—Lionel Wood, 71, Forshaw St., Barrow-in-Furness. [1572]

**1917 2½h.p. Douglas**, Model W, hand-controlled clutch, kick start, latest improvements, £54, plus 20%; also Models U and V, 1916 specification, £50, plus 10%; absolutely new; immediate delivery against priority permits for doctors, farmers, war and munition workers.—How and where to apply for full particulars, write the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [1673]

## Edmund.

**EDMUNDS** (new), 2½h.p. J.A.P., Royal Enfield 2-speed, spring frame, double tank, strongly built machine; £54/12/6; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1761]

## Elswick.

**ELSWICK**, 2½h.p., 2-stroke, 2-speed, Bosch mag., splendid condition.—Reply (letter), Holbrook, 51, Standon Park, Honor Oak Park, Forest Hill, S.E.23. [1686]

## Enfield.

**ENFIELD** Combination, 6h.p., 1916, equal to new, guaranteed; take 75 gns.—280, Camberwell Rd., S.E.5. [1397]

**ENFIELD**, 3h.p. twin, 1916 model, practically equal to new; 40 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [1928]

**1916 Enfield** Combination, in the best of condition; £70, no offers; private owner.—6, Victoria St., Warsop, near Mansfield. [X9015]

**ENFIELD**, late 1915, 3h.p. twin, and lightweight O.B. sidecar; £45; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9074]

**ENFIELD** Late 1915 6h.p. Combination, speedometer, mirror, lamps, horn, watch, tools; £70.—2, Sheffield Rd., Warrmsworth, Doncaster. [X9051]

**1917 6h.p. Enfield** Combination, lovingly equipped; £85.—George Newman and Co., 307, Euston Rd., London. 'Phone: Museum 1568 and 1569. [1575]

**ENFIELD** 6h.p. Combination, late 1914, complete with lamps and speedometer, new tyre on back, in good condition; £60, or near offer.—Jarvis, 192, Church St., Deptford, S.E.8. [1698]

**6h.p. Royal Enfield** Combination, 1915, coachbuilt sidecar, absolutely perfect condition, electric lights, speedometer, spare chains, tubes, etc. bargain; £65; only wants seeing.—118, Ivy Rd., Cricklewood, N.W.2. [1631]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Brand new 1917 Royal Enfield, 3h.p., 2-speed, soiled only, 48 gns.; 1917 6h.p. Enfield combination, 3in. tyres, as new, 79 gns.; 1916 ditto, 76 gns. (D) [1752]

**ENFIELD**, 2½h.p., 1914, 2-speed, kick starter, all chain drive, Enfield grey, tyres, head lamp, generator, rear lamp, been thoroughly overhauled, perfect throughout; £32/10.—Mehes and Mehes, 156, Gt. Portland St., W. [1536]

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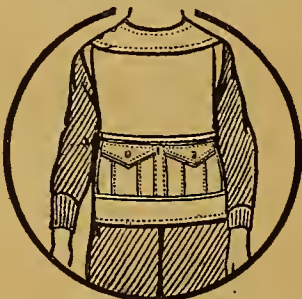
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## MOTOR CYCLES FOR SALE.

## Enfield.

**PALMER'S** Garage, Tooting.—3h.p. Royal Enfield, 2 speeds, low, light, handy, economical; £30. [1706]

**ENFIELD** 6h.p. 1916 Combination, Palmer cord light car tyres all round, large head lamp, generator, rear lamp, luggage carrier to sidecar, very nice condition throughout, and fully equipped; £82/10.—Advertiser, 156, Gt. Portland St., W.1. [7904]

## Excelsior.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1917 British Excelsior, 8h.p. J.A.P., Stormey 3-speed countershaft, underslung coach sidecar, Lucas dynamo lighting outfit; cost £115, 88 gns. (D) [1544]

## F.N.

**F.N.**, 5-6h.p., 2-speed, clutch, drip feed, as new; £28.—7, Linda St., Battersea. [1629]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—7-9h.p. F.N., 3-speed countershaft, hand clutch, kick start, underslung coach sidecar, very latest model; 69 gns. (D) [1753]

**F.N.**, 5h.p., 4-cyl., engine No. 50,419, clutch, 2-speed gear, speedometer, electric lighting, very fast and sweet running, mileage 2,700, perfect condition, full equipment; owner ordered Overseas.—Lieut. Wilkinson, Gaye's Hill, Sittingbourne. [X9008]

## Harley-Davidson.

**1917 Harley**, 850 miles, solo only, beautiful condition; £80.—Church House, Canton, Cardiff. [X9124]

**HARLEY-DAVIDSON** 1916 Combination, in exceptional nice condition; £70.—Perry and Co., 337, Euston Rd., London. [1560]

**HARLEY** (without sidecar), 7h.p., 1916½, 3-speed, perfect; £74, or nearest.—Drummond, Braeside, St. Boswell's, N.B. (D) [X9016]

**1916 Electric Model Harley-Davidson** Combination, perfect order; trial; £85.—Hawkes, 19, Pennard Mansions, Goldhawk Rd., W.12. [1592]

**1917 Harley-Davidson** Combination in stock, magneto model, lamps, horn, etc., as new.—Elco and Co., 15-16, Bishopsgate Av., Camionile St., E.C. [1051]

**HARLEY-DAVIDSON**, olive green finish, dynamic lighting, absolutely unspratched, and like new in every respect; £100.—Box L5,130, c/o The Motor Cycle. [1580]

**HARLEY-DAVIDSON** New 1917 Combination, dynamo lighting, complete; cost £150, accept £130, near offer, or light car.—Lyndhurst, 9, Douglas Rd., Highbury. [1576]

**1917 Model Harley-Davidson**, splendid condition; £115; Swan sporting sidecar; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9063]

**AIR** Mechanic must sell late 1915 Harley and sidecar, electrically equipped, top hole condition, speedometer, etc.; reasonable trial; some petrol; 65 gns.—Box L5,151, c/o The Motor Cycle. [1746]

**J. A. STACEY**, 12, Ecclesall Rd., Sheffield, has several H.D. combinations in stock, from 50 gns., all in perfect order; H.D.'s overhauled from 25/-; new parts extra; ask for quotation. [1687]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1917 Harley-Davidson, 7-9h.p., 3-speed, dynamo lighting, Phoenix sidecar, with sliding second seat, good order; 129 gns. (D) [1542]

**HARLEY-DAVIDSON** 1915 7-9h.p. Combination, mag., model, D.A. lighting, 3 lamps, electric horn, Watford speedometer, Tan-asd pillion, good condition; £65.—Ireland, 86a, Brigstock Rd., Thornton Heath. [1716]

**HARLEY-DAVIDSON** Combination, 1915, electrically equipped, aluminium disc wheels, all sound, hood and screen, etc.; £75; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9062]

**1916 Harley-Davidson** Combination, 16J (electric) Model, H.D. sidecar; £85; would exchange 1916 or 1917 Sunbeam (3½ or 8h.p., solo or sidecar), or Norton; cash adjustment; Colchester district.—Box L5,150, c/o The Motor Cycle. [1744]

**HARLEY-DAVIDSON** 1915 Combination, Rushmore lamp, generator, rear light, Klaxon, speedometer, spare cover, tube, inlet, exhaust valves, chain, sprocket, foot pump, etc., special kit tools; personally guarantee machine perfect; £65.—Capt. Axford, 6, Shirley Av., Southampton. [1734]

## Hazlewood.

**HAZLEWOOD** 5-6h.p. Combination, J.A.P. engine, 3-speed, clutch, and K.S. lamps, speedometer, special sidecar; £65; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9082]

## Henderson.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1915 Henderson, 10h.p., 4-cyl., 2-speed, hand clutch, with underslung coach sidecar, and disc wheels, smart turnout; 79 gns. (D) [1754]

## Hobart.

**HOBART**, 1917, 2½h.p., single speed; £34/13.—H. J. Marston 50, Argyle St., Birkenhead. [1644]

**HOBART**, 1917, 2½h.p., 2-speed countershaft; £40/19.—H. J. Marston, 50, Argyle St., Birkenhead. [1643]



## MOTOR CYCLES FOR SALE.

## Humber.

- PALMER'S** Garage, Tooting.—4-h.p. Humber, water-cooled, 2-speed, powerful mount; £35. [1710]
- HUMBER**, 3½ h.p., 1912 model, 2-speed, in good condition; £25.—Box L5,152, c/o *The Motor Cycle*. [1742]
- HUMBER** Twin Lightweight, condition like new, free engine, fully equipped; £25.—Buntings, Masons Av., Harrow. [1659]

## Indian.

- INDIAN**, 1916, 7-9-h.p. Powerplus, in nice condition; 52 gas. [1621]
- INDIAN**, 5-h.p., 3 speeds, run 500 miles only; £55.—Perry and Co., 337, Euston Rd., London. [1563]
- 5-h.p.** Indian Twin, fine running order; £18.—80, Bishopham Rd., Southport. [X8997]
- 1914** Indian Combination, 7-9-h.p., 2 speeds, electrically equipped, exceptionally good condition; £46.—Holyoak, Rothley, Leicester. [X9102]
- INDIAN**, 1913, 7-9-h.p., 2-speed, and 1917 coach sidecar, £45; 1913 7-9-h.p., single speed, £27/10.—Motor Exchange, Horton St., Halifax. [1621]
- INDIAN**, 7-9-h.p., 1913, 2-speed, spring frame, overhauled and re-enamelled, very fast and powerful; lowest £30.—114, Palace Gates Rd., Wood Green, N.22. [X8987]
- INDIAN**, 7-9-h.p., spring frame, clutch, 3 speeds, speedometer, lamps, perfect condition, run 3,200 miles only; price £55, no offers.—Capt. Mead, 146, Southchurch Rd., Southend. [1722]
- INDIAN** Combination, late 1914, 7-9-h.p., 2-speed, spring frame, electric lamps and horn, speedometer, all complete, and condition perfect throughout; £55.—Webb, Belmont, Surrey. [1697]
- INDIAN**, 5-h.p., latest model, 3-speed, fitted with lamps, generator, horn, etc., guaranteed not ridden over 500 miles, perfect order, as new; owner killed; £66.—Milne, Haverfield House, Spalding. [1586]
- 7-9-h.p.** Indian Combination, spring frame, all disc wheels, Palmer cords, spare cover and tube, electric head and tail lamps, Lucas acetylene set, electric horn, Zenith carburettor, tools, and spares; £68, a bargain.—Wilson, Haxey, near Doncaster. [X9027]
- RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1916 T.T. Indian, 7-9-h.p., clutch, ridden under 1,000 miles, 42 gas.; 1915 ditto, 37 gas.; 1915 T.T., 5-h.p., 3-speed Indian, 39 gas.; 1912 5-6-h.p. Indian, clutch, 25 gas. (D) [1755]

## James.

- JAMES**, all models, new and second-hand; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9064]
- GENUINE** 1916 2½ h.p. James, 2-speed countershaft, Lucas head and tail lamps, 2 generators, Lucas horn, speedometer; cost £54, sacrifice £25.—24, Tudor Gardens, Barnes. [1694]
- RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1914 James Canelet combination, 4½ h.p., 3-speed, all chain drive, clutch, and kick start, wind screen, petrol carrier, speedometer, lamps, etc.; 42 gas. (D) [1756]
- JAMES** 1916 Combination, Lucas dynamo lighting, Stewart speedometer, price £78; James 1916 lightweight, 2½ h.p., 2-speed, £35; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9067]

## Kerry.

- PALMER'S** Garage, Tooting.—3½ h.p. Kerry-Abingdon, 2-speed N.S.U. gear, excellent condition; £12. [1707]

## Levis.

- LEVIS**, 1915, 2½ h.p. model; £20.—H. J. Marston, 50, Argyle St., Birkenhead. [1645]
- LEVIS**, 1915, 2½ h.p., adapted paraffin; £20.—Dickinson, 18, Ranelagh Av., Fulham. [1700]
- 2½ h.p.** Baby Levis, 1914; £13; appointment.—Harris, 4 Public Library, Holloway Rd., N. [1619]
- LEVIS**, 1916, 2½ h.p., ridden 250 miles, perfect condition; £25, or near offer.—Lt. Keable, Egg Buckland, Plymouth. [1578]
- 1914** Levis, single speed, good condition; £20; exchange twin, or push cycle and cash.—Taylor, Harker, Carlisle. [X9052]

## Matchless.

- 1914** 6-h.p. Matchless-Jap Motor Cycle, fast, splendid condition; £24.—Box L5,146, c/o *The Motor Cycle*. [1739]
- MATCHLESS** 8-h.p. Combination, new; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9066]
- WE** Can Give Immediate Delivery of the new W.O. Matchless combination.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552]
- CROW** Bros., Guildford.—Matchless, latest M.A.G. combination, in stock, hood, screen, peace-time finish; also 1915 ditto, in perfect condition. [1727]
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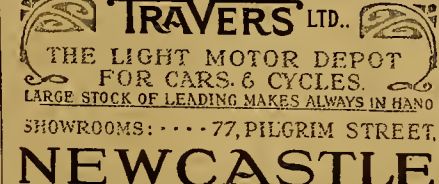
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## New Hudson.

- NEW** Hudson, 3½ h.p., 3-speed, clutch, Bosch mag.; £37/15; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9077]

- 3½ h.p. New Hudson, J.A.P., coachbuilt sidecar, 3 speeds, speedometer, lamps, horn, Dunlops; sacrifice 25 gas.—C/o Jarvis, 58, Tanner St., Barking. [X9020]

- 1913 New Hudson 3½ h.p. Combination, 3-speed, wind screen, all accessories, re-enamelled, looks like new, perfect running order; £36.—Hughes, 69, Week St., Maidstone. [1618]

- 1914-15 New Hudson with Canelet coachbuilt sidecar, 4 h.p., mag., 3 speeds, kick starter, Coway speedometer, lamps; any trial; sacrifice 32 gas.—Brown, 1, Ebor St., Wandsworth. [1717]

- 1915 2½ h.p. New Hudson, 2-stroke, Lucas lamps and horn, Veeder, gear driven cyclometer, pump, tools, spare belt; sent Saturday to Monday; bargain, £20.—Bircher, c/o Heenan, The Square, Hadley, Salop. [X9108]

- 1917 New Hudson Combination, 4 h.p., speedometer, lamps, mechanical hooter, guaranteed perfect; any expert examination; trial anywhere; spares; bargain, £78.—William Tongue, Lichfield Rd., Brownhills. [X9011]

## New Imperial.

- CROW** Bros., Guildford.—New Imperial, latest 2½ h.p., 3½ h.p., 6-h.p. models in stock; also sound second-hands. [1047]

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- IMPERIAL** J.A.P., 2-speed, clutch model, £27/10; also new models in stock; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9076]

- 1917 New Imperial-Jap, absolutely equal to new; 32 gas.; Julians, 84, Broad St., Reading. 'Phone: 1024. Closed Wednesdays 1 o'clock. [0932]

- NEW** Imperial-Jap, 1916, 2½ h.p., 2-speed, clutch, and kick starter, speedometer, lamps, and fairrort, 1,200 miles only, perfect; £35.—Harding, 3, Langdale Av., Mitcham. [1702]

- NEW** Imperial 8 h.p. J.A.P. Overseas War Office Combinations, as described in detail pages 252-3, Sep. 13th issue of this paper, exceptional machine in every detail; immediate delivery from stock; £114/9.—Colmore Depot, Distributors, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886]

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- SPECIAL** Brooklands Nortons, 3 only, brand new War Office models, no permits required; £82/10; first cheque secures.—Percy and Co., 337, Euston Rd., London. [1557]

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## P. and M.

- P. and M.**, 1914, 3½ h.p., 2-speed, Binks carburettor; trial; £32; owner prohibited riding.—Dunn, Jane St., Worlington, Cumberland. [X8990]

- P. and M.** 1914 Combination, very little used, splendid condition, lamps, speedometer, mirror, luggage grid, etc., many spares; £55, a bargain.—S., 47, Highfield Rd., Luton, Beds. [1676]

## Pope.

- PALMER'S** Garage, Tooting.—7-9-h.p. brand new 1918 Pope, superb machine; £84. [1711]

## Premier.

- 1914 Premier Coachbuilt Combination, 3-speed, fully equipped; sacrifice 20 gas.—436, Whitehorse Rd., Thornton Heath. [1728]

- PREMIER** 1915 Combination, 3-speed countershaft, new condition, tyres, etc.; 40 gas.—280, Camberwell Rd., S.E.5. [1398]

- PREMIER**, 2½ h.p., 1915, Grade gear, only done 1,000 miles, 2 lamps, horn, condition as new; £25, bargain, cost £45.—West, Basket Manufacturer, Barnstable. [X9018]

- PREMIER**, 1914, 3½ h.p., 3-speed, clutch, and K.S. Stewart speedometer, lamp, and horn, £34/15; 1916 combination, £66; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9069]



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## Quadrant.

**QUADRANT** Late 1915 4½ h.p. Combination, 3-speed, and clutch, lamps, C.B. sidecar, perfect throughout; £44.—Garland, 3, Benah Terrace, Elva Grove Rd., Weybridge. [1656]

**4 1/2 h.p.** Quadrant Combination, coachbuilt sidecar, B.S.A. 3-speed gear, 1916 model, Grado, vaporiser and spare tank, runs on paraffin, 2 lamps, horn; cost £85, a bargain, £50.—Ross, 195, Alton St., Crewe. [X9092]

## Radco.

**RADCO**, 1917, 2½ h.p., 2-stroke, as new; £25; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9061]

## Rex.

**REX**, 5 h.p., free engine, handle starting; £14/10.—Motor Exchange, Horton St., Halifax. [1623]

**REX**, 5-6 h.p., and sidecar, B. and B. mag., F.E., perfect running order and condition; £18/10; joining up.—Clarke, Grove House, Horley. [1571]

**REX** de Luxe, 1913, 6 h.p. twin, Barbury sidecar, 2-speed, clutch, drip feed, luggage grid, screen, complete accessories, spares, petrol, guaranteed; £28.—137, Alum Rock, Birmingham. [X8986]

## Rover.

**ROVER**, 3½ h.p., 2-speed, clutch, mag., good condition; cheap.—Sansom, Paignton. [X9111]

**ROVER**, 1917, countershaft model; £74/10.—H. J. Marston, 50, Argyle St., Birkenhead. [1642]

**ROVER T.T.**, equal to new; 55 gns.; 1917 model.—Julians, 84, Broad St., Reading. 'Phone: 1024. [10929]

**ROVER** Combination, 1914-15, 3-speed, new Dunlops, electric lighting, just overhauled, and in spanking condition; 40 gns.—9a, Stanford Parade, Norbury. [1654]

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**ROVER**, 1917, 3½ h.p., 3-speed, kick starter, clutch, semi T.T. bars, recently cost nearly £85, only 60 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. Closed Wednesdays 1 o'clock. [10930]

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## Royal Ruby.

**ROYAL Ruby**.—All new models supplied; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9085]

## Royal Sovereign.

**PALMER'S Garage**, Tooting.—3½ h.p. Royal Sovereign, waterproof mag.; clearance bargain, £10. [1704]

## Rudge.

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**FOR Sale**, Rudge Multi, 3½ h.p., in first-class running order; £28.—Apply, The Fife Motor Co., St. Margaret St., Dunfermline. [X8982]

**RUDGE**, T.T. Multi, £29/10; 1914, fitted for substitute, £33; 1914, I.O.M. engine, mechanical horn, lamp, knee-grips, T.T. bars, £31; 1914 5-6 h.p. Multi, clutch model, £45; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9076]

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## Scott.

**SCOTT**, 1913, Bosch mag.; £37/10; 2-speed, clutch, and kick starter; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9079]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Scott, 1916, 2-speed, clutch, kick start, 48 gns.; ditto, 1914, 29 gns. (D) [1757]

## Singer.

**SINGER**, 2½ h.p., 1913, nearly new engine; £20; offer.—Snell, Grittleton, Chippenham. [1724]

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## Sparkbrook.

**SPARKBROOK**, 1917, 2-speed, 2-stroke, as new; 29 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1543]

## Sun.

**PALMER'S Garage**, Tooting.—2½ h.p. 1915 Sun-Villiers, 2-stroke, 2 speeds; £20. [1708]

**SUN-VILLIERS**, 2½ h.p., 2-stroke, 2-speed, nearly new; a bargain; £26.—F.F., 73, First Av., Walthamstow, E.17. [1633]

**1916 Sun-Villiers**, 2½ h.p., 2-speed, clutch, practically new, horn, accessories; £25, gift.—Bullock, Bromet Place, Eccleshill. [X9110]

**SUN-VILLIERS**, 2-stroke, late 1915, lamps, spares, Palmers, splendid condition; bargain, £13/10.—3a, Station Parade, Ealing Common, W. [1681]

**SUN-J.A.P.**, 1916, 8 h.p., 3-speed Sturmer countershaft, coach sidecar, many accessories, fully guaranteed; cost £110; 78 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1355]

## Sunbeam.

**SUNBEAM** Combination, 8 h.p. M.A.G., almost new; £110.

**SUNBEAM** Combination, War Office model, as new; £105.—Percy and Co., 337, Euston Rd., London. [1562]

**6 h.p.** Sunbeam Combination, speedometer, lamps, spares, excellent condition.—Hullam, 48, Savours Rd. East, Leicester. [X9012]

**1916 Sunbeam**, 3½ h.p., lamp, new piston fitted; 265, or part exchange 8 h.p. Sunbeam.—Boniton, 18, Gell Crescent, Risca, Mon. [X9096]

**SUNBEAM** War Model Combination, 8 h.p., hood, screen, Lucas set complete, large sidecar, olive green, mileage 2,000, almost new; £125.—71, Penny St., Blackburn. [X9101]

**1916 Sunbeam**, 3½ h.p., Meads De Luxe sidecar, hand clutch, kick start, lamps, Klaxon horn, watch, finish black and gold; any trial; lowest 72 gns.—Motor, 67, Whitmore Rd., Small Heath, Birmingham. [X9120]

**3 1/2 h.p.** and 8 h.p. Sunbeams, latest 1917 models, absolutely new, immediate delivery against priority permits for doctors, farmers, war and munition workers.—How and where to apply, for full particulars write, Robinson's Garage, Green St., Cambridge. [1672]

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**SWIFT** and C.B. Sidecar, 1915-16, 3½ h.p., clutch, and K.S., complete with lamp and horn, splendid condition; £49/10; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9081]

## T.D.C.

**MARVELLOUS** Opportunity; owner ordered Overseas.—23½ h.p. T.D.C. De Luxe, all accessories, etc.; £12 secures, no offers; send cash to secure this snip.—Millard, Sydenham Rd., Guildford. [X9045]

## Triumph.

**1914 3-speed Triumph**, excellent order; £35.—42, George Rd., West Bridgford, Notts. [X9107]

**PALMER'S Garage**, Tooting.—3½ h.p. Triumph, 1912 type, Philipson pulley, with torpedo sidecar; £25. [1709]

**LATE** 1913 Triumph, 3½ h.p., S.A. 3-speed, Millford coachbuilt sidecar; £40, or offer.—Philtrip, Badby, Daventry. [X8833]

**1915 War Office Model Triumph**, countershaft, done about 4,000 miles, in perfect order; £52.—Missin, Cottingham. [X8830]

**TRIUMPH-J.A.P.**, 3½-4 h.p., footboards; £19; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9071]

**COUNTERSHAFT Triumph**, perfect order, 69 gns.; with coach sidecar 79 gns.; complete with all accessories.—Below.

**TRIUMPH**, 1914, 3-speed, clutch, kick start, under-slung coachbuilt sidecar, complete with luggage, horn, tools; three of the above in stock, 43, 45, and 47 gns.; 1914 Triumph, 4 h.p., 3-speed, solo, 37 gns.; 1913 Triumph, 3-speed, coach sidecar, 37 gns.; 1913 Triumph, 2-speed, with sidecar, 29 gns.; 1913 T.T. Triumph, 24 gns.; 1911 standard Triumph, 17 gns.; all the above have been overhauled, and are guaranteed for three months. They are complete with head and tail lamps, horn, tools, and pump.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1368]

**TRIUMPH**, 2-stroke, absolutely new condition, not done 2,000 miles; price £38/10.—Miss J. Gossip, Knowsley, Inverness. [X9023]

**3 1/2 h.p.** Triumph, Lucas lamp, horn, powerful machine, 32 working order; approval; £20; owner joined up.—Walters, Pontardulais. [1666]

**1912 3 1/2 h.p.** Triumph, just been overhauled, and in perfect condition, smart machine; £20.—Wilson, Haxey, near Doncaster. [X9025]



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## The Training of Boys for Mechanical Units.

THE future of those boys who have just left or are shortly about to leave school and have not yet reached military age is a very important question both to the boys and their parents. These boys are the material which, in normal times, would produce the motor cyclists of to-morrow; they would, many of them, become famous on Brooklands or in the T.T. The point at issue just now is not, however, that of sport, but how those boys, with a natural aptitude for the handling of machinery, may best equip themselves for the service of their country.

In last week's leader we touched upon this serious proposition, which arises, of course, from the shortage of petrol and the complete abolition of private motoring, so that the type of youth who possesses the making of a good air pilot, driver, or mechanic is without the necessary materials to enable him to qualify in private life for such sections of the Army. To-day the boy of mechanical bent enters the Army with little or none of that personal experience which, up to the present, has kept the Army supplied with the very best types for its mechanical units, and since the shortage of petrol promises to outlast the war, this state of affairs will become more and more keenly felt as time goes on.

The first two years of war skimmed the cream for the country's supplies of practical motorists, and 1917 finds us with precious few of the old stamp eligible for active service left. We have to depend now upon the schoolboy, and what chance has the schoolboy of to-day, when all private vehicles are laid aside, of developing his natural inclinations in this direction? The school of personal experience is closed to him, and he will have no special claim to be drafted into a mechanical unit when his turn comes, with the result that boys best suited for such sections may find themselves in infantry battalions, while others, with no natural inclination for such

things may be drafted, by influence or good fortune, into the Transport or Air Services.

The boys themselves and their parents must realise this state of affairs, and must appreciate further that no amount of book learning is of the same value as a little practical experience. The best all-round motorist is he who has struggled through his novitiate with a single-gear second-hand motor cycle—or who, at any rate, has been dependent upon his own resources for the upkeep and running of a machine.

One more point—it may be asked whence the necessary petrol is to come so that everyone may have a little. The settlement of this question, of course, lies with the Petrol Control Department of the Board of Trade, but a large amount of petrol would be instantly available if the unnecessary motor omnibuses and chars-à-bancs were taken off the roads. By "unnecessary" we mean those which ply between towns already well served by the railway. There are a great many of the vehicles running in different parts of the country, and not a few of them have been put on the roads since the commencement of the war. Doubtless they are a convenience, especially to those who live along the routes, but they use petrol in large quantities: the supply consumed in half an hour would suffice to give a boy a month's experience.

### The Question of Distribution.

Occasionally we receive letters from school-boys anxious to utilise their holidays in some way which will enable them to qualify for some mechanical branch, and it is with regret that hitherto we have been unable to assist these youthful enthusiasts. We have been asked, "Is there no branch of the A.S.C. or Flying Corps which makes provision for the employment of boys as drivers of motor vehicles?" And we are compelled to answer, "No, these sections prefer at present to agitate for experienced women drivers."

Whether or not the Government considers the organisation of such branches for the training



### The Training of Boys for Mechanical Units.—

of boys within the range of practicability is a matter for the Government to decide, but realising the significance of the situation we propose to use what influence we possess for bringing about a better state of distribution.

There is another method by which boys can obtain some familiarity with motor vehicles, and that is by driving the sidecarriers, tricarcs, and cars used by tradesmen in the delivery of their goods. Boys so employed will not only be of service to their country by doing some useful work, but they will spend the time which elapses after they leave school and before they reach military age in acquiring a very useful knowledge and experience of mechanics. While we do not suggest that this proposition is anything like

so attractive as despatch riding, we may assert without fear of contradiction that the experience so gained will be very valuable, and may enable boys of the right stamp to enter a technical branch of the Air Service.

Boy readers are, therefore, invited to write to us, stating fully the conditions under which they are prepared to work, together with their age, and similarly tradesmen and others willing to employ boy apprentices anxious to acquire knowledge as drivers or mechanics are invited to communicate their demands. We will then do our part in bringing our correspondents together, and we believe that this journal, circulating, as it does, amongst all classes, will prove invaluable as such a medium, thereby performing not only a patriotic service, but executing a work of real usefulness in the economic distribution of labour.

## TRADE RECONSTRUCTION.

### THE NECESSITY FOR UNITY IN TRADE AND MANUFACTURE.

**S**ERIOUS attempts are now being made to bring together motoring organisations by the establishment of a Central Automobile Control, by means of which united action might be taken in connection with the various problems which affect owners, manufacturers, and sellers of motor vehicles. Though it is recognised that the interests of all branches of the industry cannot be identical, thus rendering possible the adoption of a common policy, it is realised that in the future, as has been the case in the past, there will be many occasions on which the various bodies of the automobile world will profit by wholehearted co-operation. If such co-operation were achieved, indeed, the full weight of motoring opinion in the country could be brought to bear upon the authorities for the achievement of a single end.

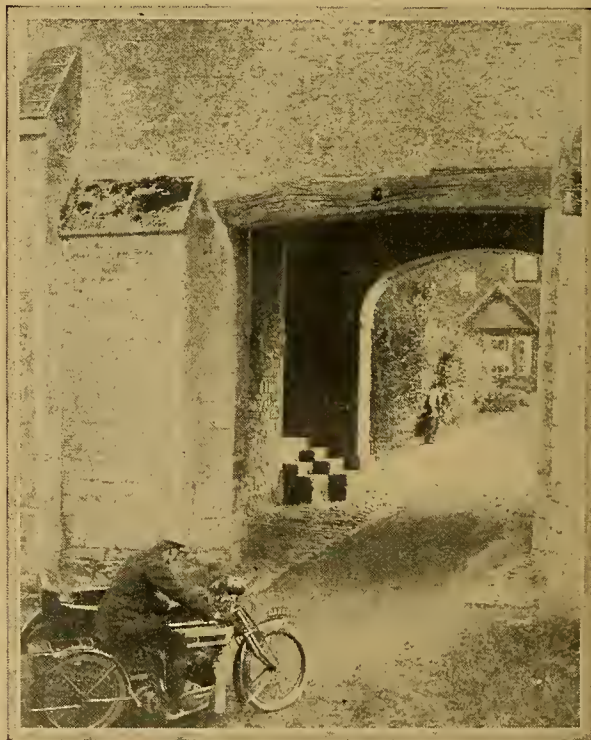
Combination of this kind will certainly be called for—combination not only between buyers and sellers of motor vehicles, but between all units of that great army responsible for their manufacture. Thus, it is to be hoped that the example of those now striving to bring together these motoring organisations with a view to smoothing out difficulties and settling disputes in their very first stages will not be disregarded by those controlling the engineering shops of this country.

### Labour Unrest Problems.

The Government recently decided to adopt the recommendations embodied in the Whitley Report, the broad suggestion being that in each trade, wherein both employers and employed have established representative organisations qualified to express the opinions of both masters and men, there shall be, as it were, local government by means of a standing joint council composed of delegates appointed by the employers, the workmen, and, at the preliminary meetings, by the Government, if the parties so desire.

Since the outbreak of war we have had opportunities of noting what waste of time and energy is involved by labour unrest. We have learned, further, that labour troubles should be tackled immediately they make their appearance, as in nine cases out of ten serious development can then be avoided. When once these troubles have taken a firm hold of the class concerned much difficulty is experienced in

handling them, and it is often through want of fair representation on both sides and a proper airing of views and emotions that such serious outbreaks are involved. Consequently, we look forward with confidence to the success of the scheme outlined in the Whitley Report, and we recommend readers of this journal, and particularly those interested in the employment of labour, not to pass by the suggestions therein set forth without due thought.



IN BUCKINGHAMSHIRE.

The spirit of solidity and endurance always seems to be exemplified in ancient archways, and these somehow emphasise the ephemeral nature of things of to-day in a most insistent manner. The old mediæval archway through which an A.J.S. is about to pass is the entrance to the old Manor House at Long Crenden, Bucks.





### Dispensing with the Magneto.

**I** SUPPOSE one consequence of the dawn of electric lighting for motor cycles will be the ultimate elimination of the magneto. We can hardly expect that manufacturers will long continue to spend £5 on a separate ignition device after they have standardised lighting outfits which contain surplus current more than sufficient for ignition purposes. We have grown so used to the reliability of the magneto that we shall not place quite the same trust in our machines when it finally disappears and our progress again fundamentally depends, as it did in the early days, upon a comparatively flimsy accumulator, and includes rather more external wiring than we have been accustomed to of late. The transformation will perhaps occur much earlier on cars and on sidecars than on solo machines; for if anybody has yet produced a light, compact accumulator, proof against the peculiarly intense stresses of a motor bicycle, I have not seen it. But the change must eventually come; and, given the right quality of accumulator, I am not in the least afraid of it. The modern coil and accumulator set is at least as durable and as reliable as the magneto in every detail, excepting only the battery; and batteries are often blamed for sins that ought rather to be visited upon switches and automatic cut-outs and inferior wiring than upon the battery itself. These ignitions are now made with frictionless distributors, and their chief merit is that they furnish a perfectly colossal spark at very low engine speeds. It is no exaggeration to say, for example, that a Douglas in very weary condition could be started on one of these ignitions if a small girl gently pushed its flywheel round, supposing that the cylinders had first been filled with mixture; and we all know that a strong man may put in quite a lot of hefty footwork on the average kick-starter without getting his engine going, because the magneto spark at low speeds is not all it should be. As soon as any firm can offer us a first-class accumulator of small size and light weight these ignitions will begin to boom, and I think their efficiency will come as a pleasant surprise to many users, especially to those whose physical handicaps and want of tuning skill oftentimes render engine starting an exhausting business.

### A Sensational Demonstration.

**T**HE engine starting possibilities of the modern coil and accumulator ignition were amply demonstrated in a feat performed by a friend of mine not very long ago. The ignition in question was fitted to a six-cylinder car. With the car standing in garage and the engine stopped, the driver engaged top gear, put the switch in the "on" position, and proceeded to pull round one of the back wheels for about a quarter of its circumference.

The engine immediately started, and commenced to propel the car. This particular car, by the way, had a range of from  $2\frac{1}{2}$  to 60 m.p.h. on top gear with the coil ignition. I myself fitted up one of these ignitions on a testing bed, equipped with an adjustable spark gap in air, and I easily got a crackling  $\frac{5}{16}$  in. spark by gently pushing the contact breaker over with the palm of my left hand. I did not push it hard enough to set it spinning, but merely turned it far enough to ensure one separation of the platinum points.

### Slow Running.

**S**UCH ignitions may play their part in improving the so-called tick-over of motor cycle engines, which in most cases would more properly be termed a "bellow round." No car owner would put up with the atrocious clatter of which most motor cycle engines are guilty whilst declutched and—save the mark—throttled down. I am well aware that crude carburation and imperfect engine balance are serious factors in the difficulty of securing a decent tick-over from a declutched single or V-twin, as is proved by the excellent slow running obtainable from a flat twin equipped with a refined carburetter. At the same time it is not easy to maintain the perfect tick-over of a first-class flat twin, and, as far as my experience permits me to dogmatise, the ignition is usually the culprit when it becomes necessary to open the throttle wider in declutching if an engine stoppage is to be dodged. In other words, you can get the tick-over if your plugs are virgin white; but the slow-speed spark of the magneto is so weak that it seizes the least excuse to shirk the leap across the electrodes, and this nuisance is scotched when you can rely on a real crackler in the way of a slow-speed spark. Moreover, you can fit a much wider angle between full advance and full retard with an accumulator than with a magneto.

### Eventually?

**I** HOPE that some day the electricians will devise a mechanical source of electrical energy which will give an even output and eliminate the accumulator altogether. If they fail in this, they will probably invent an accumulator with which you can play football, or souse in a bucket of water, without its suffering any injury. Until this millennium is reached, existing accumulators are just good enough to give the new ignitions a real right to supplant the magneto, at any rate upon motors equipped with electrical lighting. It is certain that British post-war magnetos will be infinitely superior to the German article, both pre-war and post-war, unless the Hun dodges our patents and copies us. But it does not seem likely that the magneto can offer us so good a slow-speed spark or such a wide range of ignition timing, and it bids fair to be partially superseded in the near future.



# PISTON DESIGN IN TWO-STROKE ENGINES.

HOW THE EXPLOSION FLAME MAY BE KEPT FROM THE RINGS.



**T**HE design of pistons, particularly in aluminium, has recently come into prominence, and we shall doubtless see great changes after the war is over and competition among makers starts again. Although some engineers still are doubtful as to the value of aluminium in this part of the engine, I think

there is no doubt that among the pioneers its value is realised, and when the right alloys are used and the clearances are right a great improvement will be shown.

This will be more apparent in two-stroke engines than in four-strokes, for it is in this type of engine that the great conductivity of aluminium scores, and, no matter how many manufacturing difficulties

have to be overcome, this one feature is sufficient to turn the scale in its favour. It is a strange fact that, notwithstanding the cycle of operations in a two-stroke is entirely different from the cycle of operations in a four-stroke, the design of piston is practically the same, and this in spite of the fact that sticking of the piston rings in their grooves is really a two-stroke complaint. Of course, it happens in a four-stroke, too, but not to the same extent or with the same regularity. One would have thought the makers would have evolved by this time a new sort of piston to do away with this bad feature of the two-stroke.

Fig. 2 shows the usual type of two-stroke piston. The arrow A indicates the direction of the explosion pressure, and B the direction of the connecting rod thrust. By dividing the length of the piston into three parts—E, F, and G—it will be seen that, while the top third has to take its full share of the side pressure, it has only 50% the bearing surface in relation to the other portions, for it contains the three rings, and as these do not take any of the thrust the effective bearing surface consists of thin bands of metal between the piston rings.

This is the line of reasoning and experimenting the designers of the Talbot engine seem to have taken when they evolved their patent piston, which formed a very important part of their car when it captured the 100 miles in one hour record. The car was not a huge car with unlimited cylinder capacity, but a scientific design in which every part was brought to the utmost efficiency. This design of piston is shown in fig. 3, but this is only the outline, for it is drawn from memory. The placing of the piston rings in the skirt of the piston below the gudgeon pin was stated to be a feature, and many advantages were claimed for this construction, and there can be no doubt they were justified, for it is a fine achievement to make a car travel 100 miles in one hour.

## The Talbot Piston.

At the time this record was obtained it was said that this construction of piston gave a longer life and remained pressure tight for a much greater mileage. This just bears out what I have written, for the top third of the piston has twice the bearing surface of the usual design. Then, again, the placing of the piston rings at the bottom of the piston had two advantages.

First, they prevented any oil working up the piston sides and getting burnt into carbon on the piston top; and, secondly, the rings being in a much cooler position naturally kept longer free from carbon and likewise from sticking in their grooves. I never heard that the design had any serious disadvantages, and it seems strange that such a design with its possibilities

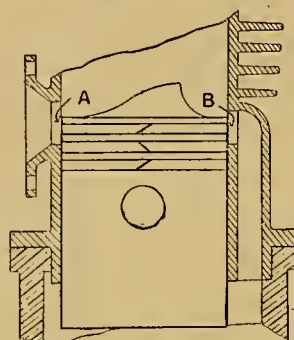


Fig. 1.—Section of part of a standard two-stroke cylinder.

ties have to be overcome, this one feature is sufficient to turn the scale in its favour. It is a strange fact that, notwithstanding the cycle of operations in a two-stroke is entirely different from the cycle of operations in a four-stroke, the design of piston is practically the same, and this in spite of the fact that sticking of the piston rings in their grooves is really a two-stroke complaint. Of course, it happens in a four-stroke, too, but not to the same extent or with the same regularity. One would have thought the makers would have evolved by this time a new sort of piston to do away with this bad feature of the two-stroke.

## The Carbonising of Piston Rings.

Fig. 1 shows a section of a standard two-stroke with the piston just passing the exhaust and inlet ports, and the small arrows A and B show how the burning gases touch the piston rings for a short space of time. The sketch was shown in this journal some little time ago when a short article on carbonising of the pistons, etc., was published, but the solution then given did not seem to me very convincing. Now, what might be the correct position for the piston rings on a piston in a four-stroke poppet valve engine might be the very worst position in which to place the rings in an engine with ports cut in the walls of the cylinder, and it seems to me that this is the crux of the whole question.

How the piston rings came to be so near to the top of the piston in an internal combustion engine will always be a mystery. I suppose the first designers

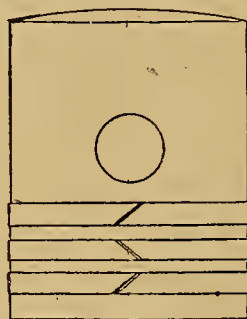


Fig. 3.—Piston used in the Talbot car, which captured the 100 miles in one hour record.



# B.S.A.

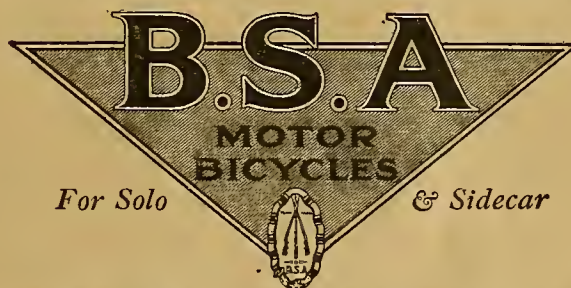
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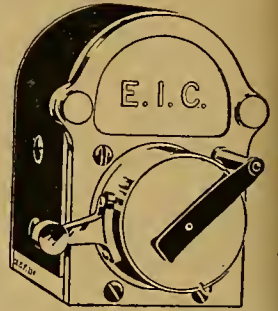


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**Piston Design in Two-stroke Engines.—**

for two-stroke work should have been lying so long dormant.

**A Suggested Design.**

I do not go so far as to advocate the adoption of this design of piston without due consideration, but I think it is one which is particularly well suited for use in an engine with ports in the walls of the cylinder, as a glance at fig. 4 will show. This is the same type of cylinder as is shown in fig. 1, with the piston in exactly the same position. Now, it will be seen that at no time can the hot flaming gases touch the piston rings, for before the piston opens the exhaust ports the rings will have passed down below the bottom edge of these ports and be shielded completely from the flames.

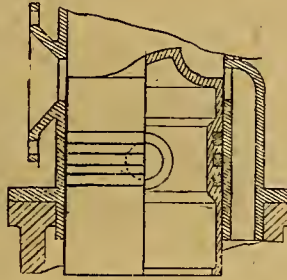


Fig. 4.—A suggested piston design for two-stroke engines.

This is an all-important point, for it is the piston ring grooves that hold the oil which lubricates the piston, and surely it must be obvious to the reader that it is only courting carbonising troubles to let the burning gases get at them and thus burn up their stores of oil. To me the wonder is that it is possible to travel more than a few hours without cleaning out the grooves in the usual two-stroke machine.

The problem of the gudgeon pin fixing in such a design presents some difficulty, but I feel confident that it can be solved in a very satisfactory manner by fixing the pin, etc., into a turned steel cage, which can be slipped inside an aluminium piston. This cage could be so made that it would act as a strengthening part of the piston, and could be made very light by drilling out any unnecessary metal.

JAMES MARTIN.

## THE FOUR-CYLINDER OF THE FUTURE.

### Some Reasons for its Adoption on Sidecar Outfits.

IT is common knowledge that the high-powered V twin is at best a compromise for motor cycling purposes. We require high power for the faster sidecar units, and high power means a multi-cylinder engine. We shall eventually choose from the following types: The V twin, the flat twin, the radial, the rotary, and the vertical four-cylinder. The V twin is the easiest to fit into a motor cycle frame, because it has a compact crank case, and its cylinder angles tuck neatly inside the standard arrangement of tubing. When we have said that we have said all, for the engine is inferior in balance to all the rival types, and it is very difficult to make it run slowly with the size of flywheel which is available, supposing that we also require it to "rev." on occasions. The flat twin is the exact antithesis of the V twin: it is extremely awkward to house in a motor cycle frame, particularly in the larger sizes; on the other hand, it is admirably balanced, and in one and the same form it will throttle down to a tick, pull doggedly on a high gear at low "revs.," and accelerate satisfactorily. The radial could probably only be housed in a modified "fan" type, for if any cylinders protruded downwards from the crank case the centre of gravity would come too high. A similar objection applies to the rotary, not to mention the problems of silencing it. The four-cylinder is rather easier to house than the flat twin; when housed its more fragile parts are probably more accessible, its balance and range of r.p.m. are slightly superior. It is clear that if the taste of motor cyclists is ever educated up to the point of fastidiousness which the taste of car owners has long since reached, the V twin must ultimately give way either to the flat twin or to the four-cylinder.

**Length of Wheelbase.**

On the general question of twin *versus* four-cylinder there are several points to be made. If a reasonably short wheelbase were as essential on combinations as it is on solo mounts, the V twin would enter the coming battle at a great vantage: but

the length of the wheelbase is a matter of very small moment where sidecar outfits are concerned. On the point of cost, the twin must score slightly every time. The four-cylinder requires more machining; and of two engines produced under equally efficient works management and on the same scale, the engine which requires less machining will be the cheaper. Still, there is not a great deal in this. Quantity production would enable a four-cylinder to be produced at a very slight cost increase over a V twin, and the difference in cost would be more than balanced by the difference in quality if both types of engine were developed to the limit.

If the taste of motor cyclists be not educated, manufacturers will be short of a stimulus towards changing their patterns. But it is sure to be educated. The smooth-running flat twins have already created a wide prejudice against the less refined makes of single-cylinders. After the war many bicycles and some cycle cars will appear with engines which possess a high degree of balance and which will throttle down decently. All these innovations will injure the vogue of the V twin.

**Give the Four-cylinder a Chance!**

Four-cylinder engines have never had a fair show in the past. They are chiefly known in the motor cycling world through the F.N., which was never pushed with very great energy in this country, and which was born in days when the details of miniature engines were imperfect in design and none too reliable in use. Simultaneously, the technical education of the average rider reached a comparatively low standard, and the multiplied possibilities of trouble were a handicap. The Henderson bicycle was winning a cosy little public of its own when war broke out, but had not been long with us, and suffered from a common prejudice against American products.

The four-cylinder does not, on the whole, seem particularly attractive for solo work, but bids fair to prove the victor where heavy sidecar outfits are concerned.

ROAD RIDER.



# **DARTMOOR** as a **TOURING CENTRE**

Some Account of the Roads,  
Beauties, and Antiquities, of  
South Devon.

By H. TAPLEY-SOPER.

*Previous instalments (including a map of the district) appeared on August 16th, September 13th, and November 1st.*



Dartmoor granite rocks.

**T**HE final tour in this series introduces our readers to the Northern boundaries of Dartmoor, for which purpose we leave Exeter via Queen Street and follow the tramlines as far as the fine equestrian statue of General Sir Redvers Buller, where we take the right hand of the fork, and about a mile and a half on, avoiding the Tiverton Road, we pass over Cowley Bridge, which spans the Rivers Txe and Creedy, which at this point follow parallel courses.

Three miles on we run through the village of Newton St. Cyres, easily recognised by its white-washed cob cottages which abut on to the narrow twisty road.

We next pass, on the right, Downes House, the residence of the late General Buller.

On entering the outskirts of Crediton, near the station, bear right, and up over a short, steep nap, at the top of which the road through the town breaks off to the left.

The earlier history of Crediton is really the history of Christianity in the West Country, and goes back at least twelve hundred years.

It was at Crediton in the year 680 that Wilfred, the great Apostle of Germany, better known as Boniface, the martyr and saint, was born, later to be slaughtered by those whom he had come to save, whose descendants are at the moment engaged in the greatest crime ever perpetrated.

In 909 the Archbishop of Canterbury proceeded to the foundation of new bishoprics in the country of the West Saxons. In one day seven bishops were ordained. Eadulph became the first bishop of the Westernmost counties, and set up his stool at Crediton, which remained the centre of his See until the reign of Edward the Confessor, when Bishop Leofric, in 1050, removed it to Exeter for greater safety against the raids of the Danes.

Of the church which existed, or was built, at Crediton at this period we have no knowledge. The present large and handsome building was erected between 1409 and 1510, and contains much of interest. The central tower, however, is part of a twelfth century building, and the font is also Norman.

In 1743 a fire broke out in the centre of the town, and in a few hours destroyed practically the whole of both sides of the principal thoroughfare; 450 families were thereby rendered homeless.

Amongst the principal tombs is that of Sir John Sully, who fought at Cr cy. In the "Governors' Room" is an old leather jacket, and other Cromwellian relics, and above the south porch is a collection of old books, including a chained copy of Fox's "Book of Martyrs."

The most important occurrence in Crediton of recent years was the funeral ceremony of General Sir Redvers Buller, who was interred here in June, 1908, when almost every regiment of the British Army sent an officer in full uniform to pay a last tribute of respect to its dead general.

Continuing on past the church, at threequarters of a mile we take the left at the fork for Yeoford, and, passing through the village of Hittesleigh, make for the main Exeter to Okehampton road (four miles), where we turn right and pass through Whiddon Down, to Okehampton.

## **Road Improvements.**

The run from Yeoford to Whiddon Down is narrow and somewhat hilly, but is of interest as a typical Devonshire "in country" road through well-wooded agricultural scenery. During the Civil War this neighbourhood was the scene of many alarums. When, in 1644, Charles I. marched westwards he stayed at the village public-house at Bow, about four miles north of Hittesleigh, and at Spreyton, near by, a Royalist soldier was hanged for plundering



A Devonshire trout stream near Lydford.



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**Dartmoor.—**

The more direct Exeter to Okehampton road/as far as Whiddon Down is very uninteresting, unless riders are anxious to test their mudguard stays, or determine how many nuts it is possible to shed in a twelve-mile run. For the past five years this section of the Okehampton Road has been in the hands of "the roadmenders," who, so far, have concerned themselves only with foundations. When the top crust is put on it promises to be one of the fastest runs in the county.

From Whiddon Down to Okehampton the road has an excellent surface, but a couple of miles from Sticklepath it is for some distance tortuous and undulating.

Shortly before reaching the hamlet of Ramsley will be noticed, on the left, the decaying superstructure



Picturesque cottages on the road from Okehampton to Lydford.

of a shaft of a disused copper and mundic mine, of which there were formerly several in this district.

At the far end of Sticklepath is a picturesque well, inscribed "Ladye well, drink and be thankful," which in these days would be of greater interest if its legend were "Free petrol, fill up thy tankful."

The approach to Okehampton is along a fine wide road down a steepish hill, which narrows as the centre of the town is entered. In the middle of the street stands the tower of the ancient chapel of St. James.

**Okehampton Castle.**

William the Conqueror conferred the manor Okehampton, or Ochementone, as it is spelt in Domesday Book, on his kinsman, Baldwin de Redvers, one of his most valliant followers, and it is supposed that he built a castle here. Whether the ruins which remain were the work of Baldwin it seems impossible to determine—in fact, so little has survived that the student of early architecture the remains of this ancient fortress present greater difficulties than perhaps any of a like character in England. The ruins of the thirteenth century chapel are the most complete. The donjon, or tower, on the top of the hill, from which a magnificent view of Dartmoor and the surrounding country is obtained, is regarded as the oldest

part now existing. Part of an Early English gateway (about 1200 A.D.) also remains, together with portions of the keep, the banqueting hall, and other chambers.

The road at the back of the castle is said to be haunted by the ghost of Lady Howard, a dame of the court of Henrietta Maria with an evil reputation. For her wickedness she is said to have been condemned to drive every night between midnight and cock crow from Fitzford House, Tavistock, to Okehampton Park, accompanied by a spectral hound, who plucks a blade of grass from the park and carries it back to the ancestral home of his mistress. Every blade must be plucked from the hillside before the penance ceases.

Apart from the defeat of the Royalist Army in 1643, at Stony Park, near the Parish Church, which is a modern structure with the exception of the tower, the history of Okehampton is practically without incident.

**Bridestow.**

We leave the town by West Bridge, over the West Ockment, and pass through a noble avenue of beeches. On the left is the entrance to the Castle grounds, in which lunch can be enjoyed if an outdoor meal has been provided for, after which the Castle ruins should be inspected.



A Dartmoor pony drive.

Leaving the Castle grounds we continue up the hill and soon reach the open moor, and note on the left Yes Tor and High Willhays (2,039 feet above sea level), the highest point on Dartmoor.

About a mile from the Castle we come to a fork, and continue along the left-hand road. At the next fork, two and a half miles on, if we select the road to the right a short detour takes us down to Bridestow (pronounced Brid'-es-tow). This is a pretty little village, with a couple of old public-houses, one carrying a slate sundial on its front, and an interesting church built of Polyphant stone in the Decorated and Perpendicular styles. It contains an unusually large hagioscope, a piscina, and a sedilia. The upper portion of the rood screen has, unfortunately, disappeared. The door to the stairs by which the rood was entered still exists. There are also several interesting heraldic memorial tablets with quaint inscriptions. The entrance to the churchyard is spanned by an ancient stone archway of the transition period between Norman



**Dartmoor.—**

and Early English, said to have originally formed part of the Norman church.

Avoiding the Launceston Road, we leave Bridestow by the left-hand road at the fork in the centre of the village and climb up a stiffish hill, over the brow of which a steep left-hand descent is shortly followed by another rise as we pass the railway station. About half a mile on we rejoin the main road, opposite the well-known "Fox and Hounds" Inn, where we turn right and pass along a fast stretch of road to the Dartmoor Inn, opposite which we again turn right for Lydford.

The country at the rear of the Dartmoor Inn is of the wildest and most desolate character, devoid of roads and buildings, or other signs of civilisation.

Here the shaggy pony and the attenuated Moorland sheep roam and feed in almost undisturbed freedom—a kind of No Man's Land, over which it is inadvisable for the stranger to wander far, except perhaps in the dry summer months, when the bogs are parched and the tracks of the moormen who attend the cattle can be more or less easily discerned. For those who are familiar with the moor and her fickle moods this district possesses a great fascination.

ing as guides to the tyro, have on occasions been known to search for the pool in vain, and then to stumble upon it accidentally in the least expected quarter.

If the reader is lucky enough to light on this spot, either by accident or design, he must not omit to respect the custom of all true crusaders to this Mecca. In a watertight tin case will be found a book in which he is required to write the date and his name, also to remove any cards he may find therein and post them at the nearest point. If he wishes, he in turn can leave cards for the next visitor to deal with; these, of course, should be stamped, and care must be taken to fasten and replace securely the box. Let him address one card to himself; weeks may elapse before it turns up to remind him of a pleasant incident of his tour.

The Rev. S. Baring-Gould, who lives in an old-world house at Lew Trenchard, six miles off, introduces this



A typical Dartmoor farm.



Norman entrance to churchyard.

Pedestrian clubs from Plymouth and Exeter spend week-ends here on pilgrimages to the elusive Cranmere Pool (five miles due east from the Dartmoor Inn), the core of the moor's great sponge, which gives birth to so many of the Devonshire rivers, but which at this point are merely insignificant trickles.

**Cranmere Pool.**

No signpost or other distinctive feature indicates the way to this much-talked-of Cranmere Pool, which in reality appears, especially in dry seasons, as little more than a dirty peat-laden puddle. Nevertheless, it has never been known entirely to dry up. Such, however, is the ever-changing state of the atmospheric conditions and the varying appearance of familiar landmarks of these parts that old hands, perhaps act-

district in his well-known novel "Urith"; and in "The Whirlwind," which was in part written at the "Fox and Hounds," Mr. Eden Phillpotts lays the district under tribute, and, in addition to depicting several well-known Lydford characters, includes some graphic descriptions of this part of the moor. The perusal of these books and similar works will help the tourist to a more thorough appreciation of the fascination and charm of Dartmoor than can be conveyed in these short articles. To a few people the first impressions of Dartmoor are apt to be disappointing, but in this case the familiar saw that "familiarity breeds contempt" is very far from the mark. Dartmoor resembles walnuts and port—the more you imbibe the greater the thirst.

**A Pony "Drift."**

During one of the week-ends that I snatched this year in lieu of a holiday, I saw one of the rare sights of the moor—to wit, a pony "drift," when 253 of the almost wild ponies which roam about the moor were driven in from an area extending from five to seven miles around the district of Widgery's Cross to an enclosure at the back of the Dartmoor Inn. The "bag" on this occasion was below the average, as owing to the war an adequate number of riders was



**Dartmoor.—**

not available to scour the country properly. The date of the drift is fixed by the Duchy of Cornwall authorities, and is intimated to the farmers through the "moormen." The moormen are the persons who rent from the Duchy the pasturage of "The Forest," and allow the ponies of the neighbouring farmers to stray over "The Forest," and who undertake to "keep an eye" on such ponies and report to the owners any matters of interest, such as deaths (which are somewhat frequent and are often caused by lightning), accidents, and perhaps births.

For the purpose of the drift and the identification of cattle the moor is divided into four quarters, and to each quarter is assigned a distinguishing mark for the ponies, which takes the form of a piece of coloured tape or whipcord, threaded through a hole punched through the near side ear of each pony. This distinguishes the "quarter" to which the pony belongs. The ownership of each pony is indicated by the branding, or burning, of a mark on the backs of the animals, generally just behind the left shoulder, the more usual mark being the owner's initial or initials.

Ponies have swarmed over Dartmoor for centuries, and have produced a very hardy breed, and being foaled in the open, and seeing very little of man, grow up in a semi-wild state. Except in very severe weather they remain on the hills throughout the year. Wet and cold they can endure, but snow robs them of food and drives them down to the borders, where they are collected and fed by the owners. A pony of about three years of age is considered fit for work, and, if a good specimen, is worth anything from £8 to £15.

**Lydford Castle and Gorge.**

Leaving the Dartmoor Inn, we take the road opposite to Lydford, famous for its Castle already mentioned, and infamous for its law. William Browne, the author of "Britannia's Pastorals," who, as we mentioned in a previous article, was a native of Tavistock, is credited with the following:

"I oft have heard of Lydford Law,  
How in the morn they hang and draw,  
And sit in judgment after."

The ravine along which the River Lyd passes on its way through Lydford village is known as The Gorge. It is an enchantingly beautiful spot, and should on no account be missed. To obtain the best view the Gorge should be traversed *against* the stream.

After taking the left-hand turn in Lydford village make for the Junction Station, just over a mile, near which is the Manor Hotel, where the motor bicycle can be left against the return for tea. The Gorge is entered through the beautiful grounds of the hotel, whence a steep winding road leads to a point where the ravine is spanned by a one arch bridge 80ft. above the rushing stream.

Having passed through the Gorge the Castle can be explored, and the return journey to the hotel be made along the main road already traversed. The total distance of the ramble is about three miles. It is doubtful if any place in England can be found to excel the scenery of this romantic spot, which has formed the theme of several poems of doubtful attainment and has never been adequately described in prose.

The parish of Lydford is the largest in the kingdom. It includes practically the whole of Dartmoor, its area being over 56,000 acres (pop. 425).

In the thirteenth century the Bishop of Exeter granted a petition from the inhabitants of "The Forest" to pay part of their tithes to the parson of Widdecombe, the plea being that their church at Lydford was "eight miles off in fine weather and fifteen in foul." To appreciate this contention properly it is necessary to experience a long night walk across the moor against wind and rain. The parish church contains a Saxon font, and near the south door is an interesting punning epitaph on George Routleigh, a local watchmaker, who died in 1802.

"Here lies in horizontal position the outside case of George Routleigh, watchmaker, whose abilities in that line were an honour to his profession. Integrity was the mainspring and prudence the regulator of all the actions of his life. Humane, generous, and liberal, his hand never stopped till he had relieved distress. So nicely regulated were all his motions that he never went wrong except when set agoing by people who did not know his key; even then he was easily set right again. He had the art of disposing of his time so well that his hours glided away in one continual round of pleasure and delight till an unlucky minute put a period to his existence. He departed this life Nov. 14th, 1802, aged 57, wound up in hopes of being taken in hand by his Maker and of being thoroughly cleaned, repaired, and set agoing in the world to come."

**Brent Tor.**

From Lydford we make for Brent Tor (two and a half miles). The road passes through some pretty and diversified scenery, but embraces the most difficult section of this tour, and should be driven with care. There is a specially tricky bit at Lydford Junction, with a steep descent around a left-hand curve, after crossing the line. If desired, Lydford and Brent Tor can be avoided by continuing along the main road to Tavistock from the Dartmoor Inn.

Brent Tor Church, built on the very top of a high rock, is now practically disused. It is said to have been erected as the result of a vow made by a merchant who encountered a violent storm in the Channel, and declared that if he were rescued he would erect a church on the first land he espied. Situated over 1,130 feet above sea level, this church is both one of the smallest and most elevated in the kingdom. It only measures 37 x 14½ ft., with a western tower rising 32ft. A modern church is in the centre of the village. It is on record that a curate of Tavistock, whose duty it was to serve Brent Tor Church, found the climb up the hill so rough and tiring that he resolved to form a roadway to the churchyard gate, but experienced some difficulty in persuading men to go out from Tavistock to do the work. However, he supplied himself with bottles of whisky, and when he saw a labourer standing idle in the market place he invited him to his lodgings, and, having saturated him with hot grog, exacted a promise that he would put in a day's work on the church path. The curate was wont to say that "Hannibal cut his way through the Alps with vinegar—I hewed mine over Brent Tor with prime Uesquebaugh."

From Brent Tor to Tavistock is a straight run of four miles.

*Note.*—The scale of the map published in our issue of September 13th to illustrate these tours is roughly two miles to an inch.—ED.





## TIMES TO LIGHT LAMPS.

## GREENWICH TIME.

Dec. 6th	...	...	4.22 p.m.
" 8th	...	...	4.20 "
" 10th	...	...	4.20 "
" 12th	...	...	4.19 "

## For Boy Readers.

We recommend boy readers to peruse the leader in this week's issue.

## Will Tradesmen Help?

This is the question tradesmen themselves must decide after reading this week's leader.

## Not All Joy Riding.

The demand for boy help is greater than the supply, but boys who wish to make themselves proficient for the mechanical section of the army must be prepared to take their work seriously and to work hard.

## Death of Mr. Robert Todd.

We regret to have to announce the death, on Monday last, of Mr. Robert Todd, in his seventieth year, at his residence at Highgate. Mr. Todd was the first chairman of the Auto Cycle Union, and continued in that capacity for many years. He always had the interests of the Union at heart, and piloted it successfully during the stormy periods of its early existence. Though never a motor bicycle rider, he was in

the pioneer days of motoring the owner of a De Dion tricycle, and was fond of recalling at A.C.U. annual dinners the statement recently referred to in *The Motor Cycle* that the De Dion Co., in their catalogue, did not recommend the use of motor bicycles, as they considered them dangerous under certain conditions, but they would make them to order.

Mr. Todd was also a member of the R.A.C. Committee and the R.A.C. Legal Committee, and, being a solicitor by profession, he was always ready and willing to give legal advice to the numerous motoring institutions with which he was connected, and never failed to give help and assistance when his services were needed. He was an able chairman, a thorough sportsman, and a good fellow, and will be keenly missed by all who knew him.

## Motor Cyclist Volunteers Wanted.

The Warwickshire Motor Volunteers have a few vacancies for motor cyclists. Prospective recruits should apply at the headquarters, 142a, Great Charles Street, Birmingham.

## Women Sidecar Drivers—All Vacancies Filled.

A notice has appeared in the press to the effect that women sidecar drivers are wanted. We recently called at the headquarters of the Women's Army Auxiliary Corps, 60, Great Marlborough Street, London, W.1, with a view to obtaining

## SPECIAL FEATURES.

CHEMISTRY OF  
THE INTERNAL COMBUSTION ENGINE  
PISTON DESIGN IN TWO-STROKE  
ENGINES.

DESPATCH RIDING IN PALESTINE

particulars regarding the work that these lady sidecar drivers were required to do, and were informed that there had been no difficulty in obtaining 120 recruits, and that no more were needed at the present time.

## Liverpool Volunteer Motor Cycle Club.

The secretary of the above club informs us that it has recently been somewhat modified in form, so that any motor cyclist who wishes may become a member. In view of possible developments after the war, the secretary invites all interested to communicate with him—J. E. Wilkins, 114, Penny Lane, Wavertree, Liverpool.

## A Smoking Concert.

A concert will be given on the 13th inst. by the above club, and admission is by programme, which may be obtained from the secretary, price 2d. The performers at the concert—to be held at the Compton Hotel, Liverpool—are the Titan Concert Party, from No. 898 Co. A.S.C., M.T. (Tractor Dept.), by permission of Maj. Hewson, O.C.



FUEL FOR THE AIR SERVICE.

Not a gas trailer, but a petrol trailer containing just a little petrol tank for one of our aerodromes.



### Coal Gas and the Government.

The Times says: "It is understood that the Government is considering the situation which has arisen from the substitution of gas for petrol in vehicles which the Petrol Committee has refused to license. Numbers of cars, the running of which is regarded as unnecessary, are now in the hands of motor manufacturers for conversion into gas-driven vehicles. One large firm is said to have work of this kind on its books to last for two years. As the men engaged on the work of conversion are of a class whose services are urgently required for essential war work, it is highly probable that the use of gas as a propellant will be forbidden to the owners of all cars to whom a petrol licence has been refused."

### Can Petrol be used to attend Religious Services?

A car owner was recently summoned for using petrol or petrol substitute to drive a motor car, such use not being expressly authorised. It was stated that defendant was a devout Roman Catholic, and his ordinary and nearest place of worship was at Wrexham, four miles from his residence. The old Act making it obligatory upon people to attend Divine service had never been repealed. Even under the new Order a car could be used for household affairs, and the magistrates were asked to say that the household affairs of a family included the taking of the family to their ordinary place of worship.

It was unanimously decided to dismiss the case.

### Another Case.

But a short time ago a lady was fined for an exactly similar offence in S. Wales! She, however, was not a Roman Catholic, we believe, though if this had anything to do with the case we cannot say.

### Disposal of War-worn Motor Cycles.

A motor cycle trader, who is specialising in the sale of motor cycles to war service workers, and is doing a large business in this branch of the trade, relates to a correspondent the recent visits he made to the A.S.C., M.T., depots for the purpose, if possible, of purchasing war-worn mounts rejected or "unfit" for service. At the first depot he visited he was referred to another depot in the near neighbourhood. Upon making known his business, he was told at the premises in question that there was no information to be given as to the disposal of the machines, and was given no instructions whatever in the matter. Visiting a third and larger depot, the trader was unable to obtain any information re the disposal of the machines.

### The Silver Badge.

The Secretary of the Admiralty announces that—

Under the provisions of the Military Service (Review of Exceptions) Act, 1917, the following amended conditions for the award of the silver war badge have been approved for H.M. Naval Forces:

The badge will be granted, subject to the approval of the Admiralty, to the following who have served in the Naval Forces since August 4, 1914:

(a) Those whose services have been terminated, after service at sea or abroad,

on account of wounds or physical infirmity for which they were not themselves responsible.

(b) Subject to their being over military age (as defined in the Military Service Acts) or certified as permanently and totally unfit under the Review of Exceptions Act, those whose services have been terminated:

(1.) After service at home only, on account of medical unfitness for which they were not themselves responsible.

(2.) After service at sea, abroad, or at home, on account of age or other cause not within their own control.

### Disinterested Evidence.

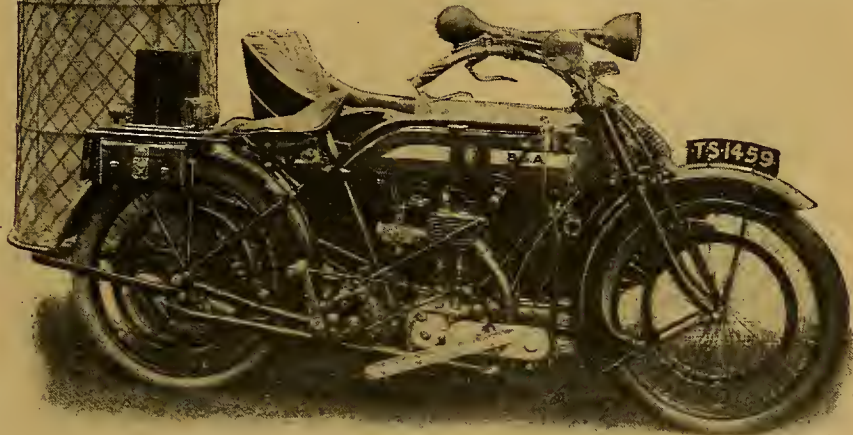
When Mr. Barnfather, a motor cyclist, was summoned at Bromley last week for driving a motor cycle with an inefficient silencer, he read a letter written by his wife stating that the machine was not making a loud noise or she would not have been in the sidecar. The bench, unconvinced, fined him 10s.

### A Low-pressure Container.

The illustration on this page is of a B.S.A. sidecar owned by Mr. Stonier, of Greenside, Maryfield, Dundee. The container is designed to stand a pressure of about three atmospheres, and so far Mr. Stonier has been able to obtain about fifteen miles to the charge (twopence). The container is about 5ft. by 2ft. 6in.; the outer network is of galvanised iron wire. The top is covered with water-proofed material and the inside is lined to withstand pressure, the construction being such that the rubber cannot become chafed or be affected by the sun. Mr. Stonier has arranged his carburettor so that he can start up on gas and turn over to petrol at any desired time without dismounting. This is the first gas-driven machine in Dundee or district.



A coal gas container designed to stand a pressure of three atmospheres. The owner is Mr. Stonier, of Dundee, who says one charge will run him fifteen miles. (See par.)



### The National War Relief Funds.

At the week-end the principal war relief funds stood as follow:

The National Relief Fund (distributed £5,728,472) ..	£6,296,615	0	0
British Red Cross Fund ..	8,125,782	0	0
Tobacco Fund ..	141,073	0	0
King George Sailors' Fund ..	86,281	0	0

### Ambulance Sidecar for Birmingham.

As already stated, the Easting Windscreen Co., 79, Colmore Row, Birmingham, who are soliciting subscriptions for the purchase of a Red Cross sidecar in the Birmingham district, inform us that the Campion Cycle Co., Nottingham, who manufacture a luxurious ambulance at a total cost of £125, have generously offered to supply at £100.

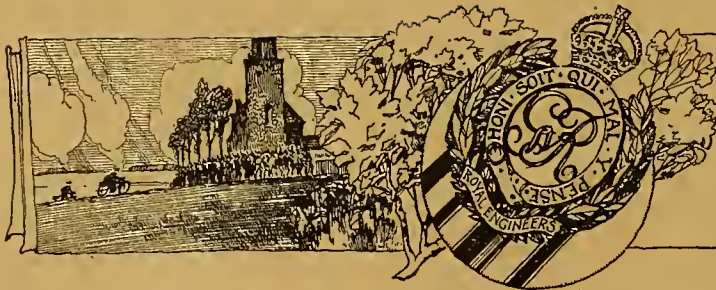
### The Late Mr. H. A. T. Moroney.

In the death of Mr. H. A. T. Moroney many motor cyclists will lose a good friend, though comparatively few came in contact with him. In his capacity as head of the Touring Department of the Royal Automobile Club he worked out many routes for the A.C.U. members in times of peace. He joined the Club in the early days, and developed the Touring Department from a very small department of the Club, until it became one of its most important sections, actually serving as a model for other similar organisations not only in this country, but abroad. He was an able and efficient organiser, had great charm of manner, and seemed as if he could never take sufficient trouble for any enquirer.

### N.O.G.O.

Several people appear to be under the impression that the M.A.G. Engine Co. is a German concern. Nothing is farther from the truth. The mysterious initials stand for the words "Motosacoche, Acacias, Genève," and surely there is nothing German in this! The M.A.G. engine is made in Geneva, the chief town in Switzerland, which is notoriously pro-Ally, and the energies of its manufacturers are devoted almost entirely to the making of munitions for the Allies. Possibly people are confusing the title with the initials "N.A.G." (Neue-Automobil-Gesellschaft), a Hun firm which never had anything to do with the manufacture of motor cycle engines. The initials forming the title of this paragraph (this is an age of abbreviations) mean—not of German origin.





## MILITARY NOTES.

### A NEW AIR BADGE.

R. N.R. and R.N.V.R. officers attached to the R.N.A.S. are to wear a gilt "A" with wings on the shoulder straps and above the distinction lace on each sleeve.

### AN INTERESTING APPOINTMENT.

IN the *Gazette* we notice the appointment of F. W. M. Pedley, Sec.-Lt., R.F.C., whose name is a household word among motor cyclists by reason of the thousands of tyres and belts in use bearing his name. Lt. Pedley joined the Military School of Aeronautics at Reading in July, as a third-class equipment officer, and was subsequently given an important position with a Vulcanising Group of the R.F.C. His is a case of a round peg in a round hole—a consummation devoutly to be wished in all Army appointments, but, unfortunately, an ideal not always attained.

### GENERAL GOUGH'S EXPRESSION.

"STAFF CAR," A.S.C., M.T., writes in reply to "O.C. Taxicabs": "These are a few facts which should squash 'O.C. Taxicabs's' letter of the 24th ult. re the Army Safety Corps and their cushy jobs: (1.) A Special Order of the Day, signed by General Gough, expressed his

### R.F.C. OFFICERS.

Sec.-Lt. Wilkins, of Sheffield, a competitor in the last A.C.U. trials, is still finding his Norton of service, his brother officer also appreciating its usefulness.

admiration and thanks to the M.T.'s for the way they carried out their work in bringing ammunition (right to the gun pits), supplies, troops, and in evacuating wounded during the severe battle of Ypres and Messines.

"(2.) A famous statesman recently stated in Parliament that a glance at the casualty list shows the A.S.C. cannot be regarded as 'non-combatant corps.'

"(3.) Probably the majority of the Tank drivers and mechanics were A.S.C. before transferring.

"(4.) Go to our discharge depot in England and see battalions of corks, the result of our 'cushy job.'"

### ADDRESS WANTED.

WILL "E.M., R.E.," writer of "Despatch Riding in German East Africa," send an address to which letters may be sent?

### INCREASED RATE OF PAY.

A STATEMENT of the increases in Army and Navy pay, which are to take effect from September and October 1st respectively, was made in the House of Commons last week. The total increased charge is approximately as follows: First year, £65,000,000; second year, £69,000,000. Royal Engineers will continue to be rated as at present, but in no case will regimental pay and engineer or corps pay together be less than 1s. 6d. a day. An additional 1d. a day will be given to all British soldiers on normal rates of pay for each complete year's service since the outbreak of war. Hospital stoppages are abolished.

### RATE OF PAY—ANOTHER ASPECT.

THE following letter was written for and by request of D.R.'s attached to the Army Signal Company in Mesopotamia, and deals with the rate of pay of various units:

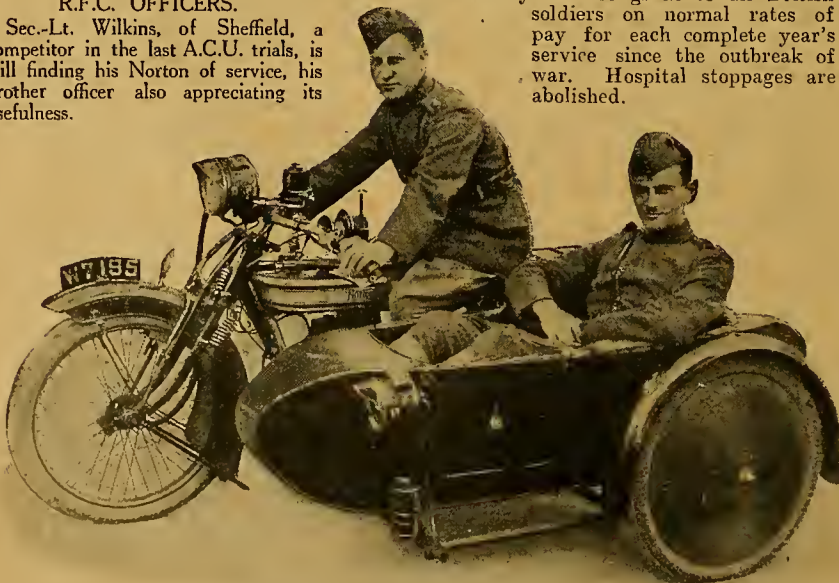
"When war broke out, several of us offered our machines and services as D.R.'s, but were told that the authorities had more applicants than they could cope with, so we joined the Territorial Infantry. Our battalions left England between October, 1914, and January, 1915, for India, where we had to go through the strenuous training which was to fit us for active service as infantry. In August, 1916, the battalions were asked to supply 'experienced motor cyclists for service' (not desirable men for training as D.R.'s), and those of us who were recommended as such were sent to the Signal Depot, Poona, India, to form a D.R. Section, which numbered thirty D.R.'s. As soon as our machines arrived we were despatched to Mesopotamia.

"Our section is composed of 50% of men who were motor mechanics before the war; the other 50% are men of several years' experience with their own machines.

"Our 'grouse' is not about the pay question, but about our being 'desirable men for training as D.R.'s from infantry in India,' and our being 'newly trained, in most cases having seen no active service, and working side by side with experienced motor cyclists with two and a half years' service to their credit.' We may state that we have not had one hour's training as motor cyclists in the Army.

"As a matter of fact, it is not the two and a half year men who have so much to say in the matter as the men who have only been in the Army about twelve months or so, and been taught all they know of motor cycles since joining. Their whole argument seems to us to be: 'We were trained as D.R.'s at Dunstable, therefore we are D.R.'s, whilst you who have never been to Dunstable cannot possibly be D.R.'s or know anything at all about motor cycles.'

"As regards the 'pay,' we know men who were at Dunstable for nearly twelve months at the rate of 3s. per day, whilst we were some on service and some in training as infantry for two years at 1s. per day. If these two and a half year people think we do not deserve the 1s. 2d. extra, what must they think of the Australian D.R.'s in this country with their 10s. per day?—SOME OF THE DESIRABLE MEN FROM INFANTRY IN INDIA."





# THE TANK IN TRAFALGAR SQUARE.

An Attractive and Interesting Government Office at Last !



The "Tank Bank" in full swing.

ON Monday, Nov. 26, Male Tank 130 was installed in Trafalgar Square, and was opened for the sale of War Bonds or War Certificates, each being stamped "Tank Bond" or "Tank Certificate." Thousands of people availed themselves of the opportunity of walking round and duly examining one of these monsters, which have proved to be so successful a weapon in the present war. So much has been spoken of German inventiveness in the field of science as adapted to modern warfare that it is refreshing to know that the Tank is entirely an English idea, and, as has been proved in the last advance towards Cambrai, is a supreme success.

The opening ceremony was performed by the Mayor of Westminster, Sir George Wilby, and the first Bond was purchased by Lt. McArthur, R.F.A., a wounded officer, who was wheeled up to the Square in a bathchair some time before the official time for the opening.

The Tank is the genuine article and fully equipped, and, according to Lieut. Brannon, Tank Corps, who is in charge of it, is a standard pattern Tank as

used in the recent advance. It is absolutely complete with engines and guns, and inside it are two girl clerks from the G.P.O., whose duty it is to stamp the Certificates purchased in the small hut adjoining.

In the course of the day the Tank was visited by the Prime Minister and by Mr. Bonar Law, the Chancellor of the Exchequer. Sir George Wilby purchased a £50 Bond, and his example was followed by Sir Robert Kendersley, chairman of the War Savings Committee.

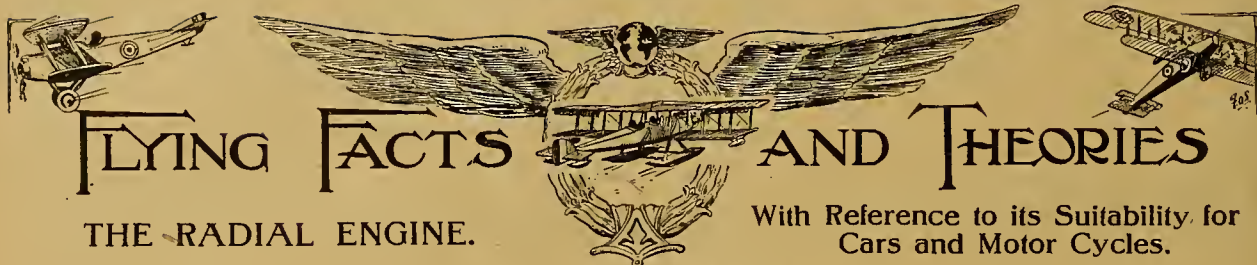
It may be remembered that *The Motor Cycle* was instrumental in obtaining several thousands of recruits for the Tank Corps when it was first instituted in 1916, as the Heavy Section of the Machine Gun Corps, and its staff personally examined numbers of these men as to their technical knowledge before they were enlisted in the Corps.

In addition to the Tank several other interesting war relics were exhibited, and among these may be mentioned an anti-Tank gun, which is a converted 77 mm. German field gun, the conversion merely consisting of a lowered cradle, giving the gun a lower position above the ground.



Lt. McArthur, R.F.A., the purchaser of the first "Tank Bond," after having his Bonds stamped.





By W. G. ASTON, A.M.I.A.E.

OF all the types of internal combustion engine which the development of the aeroplane has brought into being none seems to possess so many attractions, from the motor car and motor cycle point of view, as the stationary radial. The rotary radial, of the Gnome type species, has been, aeronautically, in considerably greater prominence, and to-day certainly exists in greater numbers, but for several reasons it seems to be regarded as an engine suitable only for aircraft, and it is not, therefore, the subject of so much interest and speculation on the part of those who still look to the road to provide the greatest joys of locomotion. This is a somewhat singular state of affairs, as, if my memory serves me right, the rotary engine, in the form of the Adams-Farwell, an American production of seven or eight years ago, made its first appearance in the chassis of a motor car, whilst the stationary radial type—of which the Y Anzani was, I believe, the first successful instance—was produced solely for aeronautical work, and this is, of course, still the case. But there is not the slightest doubt that as soon as the clatter of war is stilled this is the type to which progressive motor car and motor cycle manufacturers will immediately turn their serious attention.

#### The Crank Case.

Such a prediction is well founded in the fact that automobile constructional progress is almost inseparable from reduction in weight, and it is in this important regard that the radial engine possesses such a great advantage over its contemporaries of the accepted cylinders-in-line type. To begin with, the crank chamber is reduced to its smallest possible dimensions, and at the same time is brought to a perfectly symmetrical shape, so that at a single cut an enormous bulk of metal is dispensed with. This is an especially notable point, inasmuch as the crank chamber is in no circumstances an active component of an engine, that is to say, its secondary functions of keeping oil in, and dirt out, providing arms for the support of the engine, and acting as a platform for the magneto, etc., have become really of more importance than its primary object, which is to act as a distance-piece between the cylinders and the crankshaft. In the ordinary type of cylinders-in-line engines the crank chamber has always infinitely more weight than its mere function of a distance-piece would require, owing to the shape which is imposed upon it by the other considerations mentioned. In the radial engine, however, it can be made a distance-piece of the simplest possible form and of the lightest possible weight without affecting its utility as a protection covering and a platform, for which purposes it will be subject to very little addition in weight or strength.

Turning now to the crankshaft, an almost equally agreeable state of affairs is disclosed. In the first place, it is very greatly reduced in length, and hence can either be made much lighter for the same degree of strength, or, alternatively, can be made very much stronger for the same weight. In long multi-cylinder engines requisite stiffness of the crankshaft can only be obtained by making the journals of big diameters, so leading to much additional expense in cost of production, as well as to increased weight in the whole engine, since bearings and brackets must have their dimensions altered in proportion. Insufficient stiffness in the crankshaft permits of a twisting effect taking place which leads to the engine suffering from disagreeable periods of vibration. In this respect, therefore, the radial engine is at a great advantage as a single crank throw, which will be naturally of great rigidity, can take care of anything up to seven cylinders, and, for equal stiffness, will probably be four or five times less heavy than an ordinary four-cylinder shaft designed to transmit the same torque.

#### Big End and Connecting Rods.

Certain disadvantages have to be set against the desirable shortness, strength, and simplicity of the radial engine's crankshaft, and of these the first that naturally comes forward for consideration is the dimensions of the big end bearings, since from three to seven big ends have to be placed on the same pin. Since this pin must be of not more than a definite maximum length it follows that bearing surfaces have to be relatively small, even if the diameter of the crank pin be considerably increased, as it can be within reasonable limits without introducing trouble. This trouble can be met in one of three ways. Either all the big ends can be carried directly on the pin, in which case all but one will have to be forked, or drilled, so as to avoid the necessity of setting the cylinders in more than one plane; or one connecting rod must be made a "master" and the others articulated to its big end; or, the cylinders being in one plane, each connecting rod, instead of having an end which completely encircles the crank pin, can be formed with a "foot" which abuts against it, the whole set being enclosed by two floating rings. In this case the "feet" of the connecting rod will be brought into lateral contact with one another, and will consequently have to be provided with suitably shaped projections for this purpose.

The second method, *i.e.*, employing the master rod, is the one that is most favoured by designers at the present time, principally because it allows all the bearings to be made of good size. The weight of the articulations on the master rod is, it is true, not entirely rotating weight, since it has a slight recipro-



**Flying Facts and Theories.—**

cating motion, but the latter is not of great consequence. Nor is the fact that the master-rod principle involves a slight lack of symmetry in the reciprocating parts—e.g., the angularity of all the rods is not the same, consequently the axial travel of all the pistons is not identical, and hence a certain slight lack of balance is promoted.

**Cam Design and Induction.**

With regard to the operation of the valves, one finds that here the radial engine is at some slight disadvantage in point of simplicity of arrangement. A pair of single cams will certainly operate innumerable push rods in place of the usual two for each cylinder; but such cams will necessarily be of large diameter, and their peripheral speed, therefore, will be very high. This can be overcome by using cam discs with two or more cam profiles upon them and driving them at a reduced speed: this principle will have the further advantage of reducing the load on the cam bearing.

The next point that crops up is the matter of distribution, and here it may at once be admitted that certain difficulties have to be encountered. At or about full load there is, probably little difficulty in getting the cylinders all more or less equally full of gas, and this is reasonably sufficient for present day aeronautical purposes. For motor car and motor cycle work, however, we expect and demand each cylinder to pull its proportional amount of weight at all throttle openings, and in respect of this quality the inlet piping arrangements call for very careful study. It is more than probable that a fan will be incorporated in the system, not so much with a view to super-charging the cylinders as to provide a complete atomisation for the gas, as well as to promote a constant direction in its flow.

**Lubrication and Cooling.**

The same applies to the question of lubrication. Not only can we not afford to blow large quantities of burnt, but otherwise unused, lubricating oil through the exhaust pipes of the bottom cylinders, but we also require dry sparking plugs and a generally clean engine. A simple system of the "splash" type is therefore out of the question. Instead one must employ some arrangement whereby the oil, after being fed to its work, is positively taken away from it and not allowed to wander into places in which it is not wanted.

As far as cooling is concerned, there is nothing to worry about. The stationary radial is an almost ideal type for air cooling, and is thus particularly suitable for motor cycle and cycle car work, in which a powerful fan is not called for. No one would dream of using anything but valves in the cylinder head for such an engine, and consequently little trouble may be anticipated from distortion. Aluminium cylinders with properly proportioned ribs will ensure an adequate heat distribution. In regard to cooling, the rotary radial is at this great advantage, that, no matter how you cover it in it will pump itself a good supply of air, provided you leave a reasonable entrance and exit; on the other hand, the cylinders in doing this pumping work take rather more power than would a fan of equal effectiveness, and, furthermore, they have to be made strong enough to withstand centri-

fugal force. Otherwise, on the points already dealt with, the rotary radial shares the same advantage as its stationary fellow.

**Excellent Balance.**

In point of balance the radial engine of either type leaves little to be desired. Considering first the engine in which the cylinders are arranged in one plane, an even number of cylinders can be perfectly balanced, but the torque will not be so continuous as that provided by an uneven number of cylinders, which, however, cannot be quite so perfectly balanced.

In considering the stationary and rotary radial engines in which fewer than seven cylinders are used, it is necessary to point out that the former demands the addition of a flywheel if a reasonable degree of controllability is to be attained. Such a flywheel will, however, almost inevitably incorporate the fan, and hence the nett increase of weight will be nothing extravagant.

**Stroke-bore Ratio.**

In the case of motor cycles, it is unlikely that more than five cylinders will ever be called for, as three cylinders will provide an engine highly suitable for most purposes and capable of working up to pretty big powers. Such a motor will be in a single plane, and would, power for power, when placed lengthwise in the frame take up little more room than a single cylinder. In small sizes no difficulty would be met with in placing it across the frame, either with the vertical leg of the Y at the top or at the bottom, according to which arrangement is found the better for protecting the cylinder heads against damage in the event of a smash. It may be urged that the radial engine, unless it is to be of very considerable diameter, compels designers to adopt a short stroke. This is perfectly true, but that this constitutes a serious disadvantage is open to question. The long stroke engines of motor cars are in nearly all cases the direct result of an absurd taxation formula, and I am pretty confident that if once designers could get free from this irritating yoke the majority would be inclined to reduce the stroke-bore ratio. In motor cycle practice it is common knowledge that comparatively short strokes are in favour.

**Accessibility.**

So far as accessibility is concerned no trouble need be anticipated for the radial in motor cycle work in whatever position it comes to be placed. In cars this is a point that will have to be properly tackled.

That the coming of the radial engine into the motor cycle and motor car world will bring with it many blessings there is hardly any room to doubt, but that it is a type which can immediately be adopted and made successful by persons with no previous experience of its own particular little troubles is an idea which should not be allowed to take root in any would-be manufacturer's mind. On the other hand, its demonstrable benefits are well worth all the trouble they are likely to involve, especially if, as one hopes, will be the case, designers are content to throw aside the clumsy standards to which they have previously made engines, and adopt not only the highest quality of material, but also the greatest possible accuracy of workmanship. Only by reasonable means and sound systems of production can true economy successfully be sought.



# MOTOR CYCLE MESSENGERS.

Another Field for the Activities of Motor Cyclists, involving Free Petrol and other Rare Gifts.

**P**RELIMINARY details have appeared in this paper concerning the service of motor cycle despatch riders between certain Government Departments. We are now able to give an outline of the scheme which has been officially decided upon by the authorities.

The service will be known as the Auto Cycle Union Motor Messenger Detachment. It will be supervised by an official of the G.P.O., and the detachment will be under the immediate direction and control of the secretary of the Auto Cycle Union, subject to any regulations made by the Motor Transport Department of the War Office through the R.A.C.

## Details of the Duties.

The duties of the service will be to provide a fifteen minute service by motor cycle or light car day and night, Sundays included, between certain Government Departments, and to execute other similar duties as may be from time to time required.

Application for enrolment in the A.C.U.M.M.D. will be limited to male British subjects who are owners of motor cycles, two-seater cars, or cycle cars.

Members are not required to bind themselves for any definite period, and may retire from the work on a fortnight's notice. Advantage can be taken of short

period work for three or four weeks at a time. A minimum of four hours continuous duty must be performed each week, but in all cases the hours of duty, so far as possible, will be arranged to meet the members' convenience. Those who wish to be temporarily relieved of duty must give at least a week's clear notice.

## Uniform and Expenses Allowance.

A cap and armband, both bearing the distinctive badge of the detachment, must be worn on duty. An order form for the cap, price 15s., must be obtained at headquarters.

The uniform of an R.A.C. War Service owner-driver, consisting of officer's field service tunic, without braiding or badges of rank, breeches, and puttees or leggings, may be worn. No allowance is made for the purchase of this uniform. This means to say that if the member of the service does not wear the R.A.C. owner-driver's uniform, he need only wear, in addition to his ordinary clothes, a cap and armband.

Petrol will be supplied as required at the public expense. In no case will petrol be allowed for consumption at a rate exceeding one gallon for thirty-five miles. All other running expenses, including wear and tear, depreciation, re-

pairs, tyres, oil and grease, etc., will be covered by an allowance of 1d. per mile whilst on duty, and whilst proceeding to and from headquarters within a radius of ten miles.

Members will be insured free of cost against personal injury and aircraft risk. Third party claims, damage to or loss of machine by accident, aircraft, fire, and burglary, whilst on duty, will also be insured against free of cost.

A sustenance allowance of 1s. an hour whilst on duty may be claimed. Drivers will also have the privilege of using the C.T.O.'s buffet, which is open daily between the hours of 3.30 a.m. and 11.30 p.m. for the sale of refreshments, and a special room will be provided for the accommodation of members of the Detachment.

## How to Enrol—A Personal Interview Necessary.

Before anyone may enrol in the Service, he must apply to the Auto Cycle Union, 83, Pall Mall, London, S.W.1, for a form of application, and it is expressly stated that enrolment cannot be completed *without a personal interview*. Enrolment forms may also be obtained on application to the offices of *The Motor Cycle*, 20, Tudor Street, London, E.C.4.

# A Prosecution under the New Order.

## NO SUNDAY BUSINESS JAUNTS!

**O**N Tuesday, November 27th, at Merthyr Police Court, Mr. Henry Roberts, general dealer, Merthyr, was summoned for using or causing to be used petrol or petrol substitute for the driving of a motor cycle with sidecar on Sunday, 11th November, for purposes other than those permitted by the Motor Spirit Restriction Order, November, 1917.

Mr. F. C. Shackel, Cardiff, instructed by the R.A.C., was for the defendant.

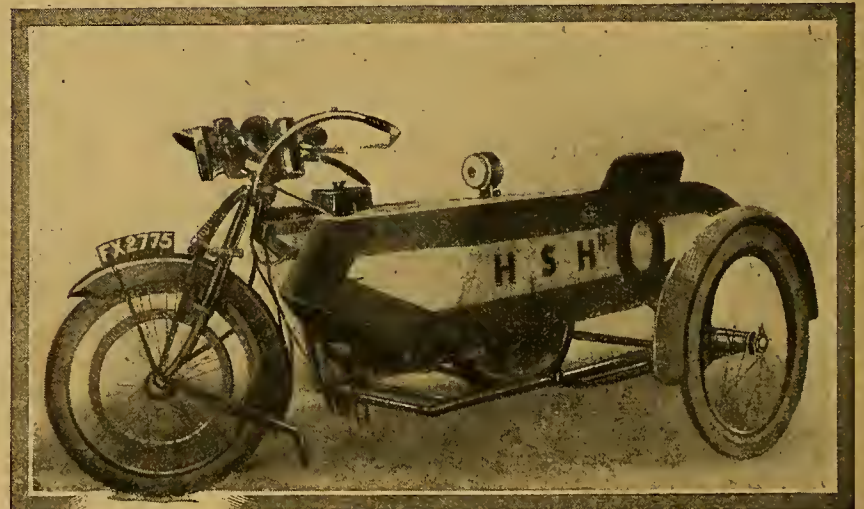
Police-sergeant Goodwin saw defendant returning home, near the General Hospital, on a 6 h.p. Sunbeam motor cycle, with sidecar, in which his wife was seated. On the following day defendant called at the police office and said he used the machine for the purpose of going to the Storey Arms Farm, Breconshire, to get butter and eggs. The machine was registered for private use.

Chief Constable Wilson said that he saw the defendant and his wife going through Cyfarthfa Park on their way home. Apparently no goods were being carried, and the car was not constructed for carrying goods. The Cyfarthfa route in respect of direction would have been a short cut.

Mr. Shackel said defendant kept the Gwaelodgarth Post Office, and was also a general dealer. He had dealt with the Storey Arms (a farm, formerly a public house), in Breconshire, about two years for supplies of butter, cheese, and eggs. He thus went over there continually, but owing to the pressure of his duties he could get away only on a Thursday or a

Sunday. There seemed no question as to whether the petrol was being legitimately used in the execution of defendant's business, but the point of dispute cropped up as to whether business trips, involving the use of petrol, were permissible on Sunday. The inference

was that it is a very simple matter for a tradesman to hold over some business errand till Sunday, and thus obtain his Sunday joy ride under the cloak of business. The case, however, was dismissed, but with a warning to the effect that Sunday business must be taboo.



## UNIQUE BODY DESIGN.

A sidecar of novel design made by Mr. H. S. Ham, of Weare, Somerset. The sidecar, which is made of three-ply ash, is of similar design and colour to the tank of the B.S.A. motor cycle to which it is attached.



## DESPATCH RIDING IN PALESTINE.

Experiences of a D.R. with  
Two and a Half Years'  
Service in the E.E.F.

NO one who has not experienced it can possibly understand what motor cycling near the Line in France really means. The mud and wet in winter and the dust in summer are experiences quite foreign to anything ordinarily obtaining in this country. Even the conditions in the most Lancastrian of Lancashire towns on a wet January night are bliss compared with those faced by a despatch rider in France; but from one or two recent letters that have appeared in *The Motor Cycle* it would appear that even France cannot reach the very limit of motor cycling discomforts, and the experiences described by Cpl. A. C. Webb, a despatch rider in Palestine, make very interesting reading, more especially as important military operations have recently occurred there.

"At the present time," he writes, "I am attached to a Mounted Brigade Headquarters Signal Troop, and, being with mounted troops, I am able to get to the forward area to a much greater extent than the majority of D.R.'s on this front.

#### The Holy Land and its Wadis.

"Much of the work here is done on low gear. Top gear 'blinds' are very rare excepting behind the lines. There one can get top gear running on 'wire tracks,' i.e., a 10-12ft. width of wire netting (about 1½ in. mesh) laid on the surface of the desert for the use of light motor vehicles, etc. But the real joy of a D.R. in the forward area is a newly made camel track, down which no other traffic has passed, and then he may, in a moment of delirious delight, indulge in a mild 30 m.p.h. 'burst,' taking his chances, of course, of suddenly meeting cross tracks, which are not always easily discernible, and are always apt to be dangerous.



Looking along a large "wadi" or dried up river course. It is the D.R.'s lot to travel frequently along the beds, which are made up of rocks, shingle, and sand.

"One's time for a trip out here cannot be estimated by distance but by the surface nature of the country crossed. Running over ploughed fields, heavy sand dunes, and about mountainous 'wadi' country does not permit 'fast' times to be set up. This country seems to be a network of 'wadis' great and small. These 'wadis' are really dried up river beds or watercourses of every description, and are usually wet only at one period of the year. It is a D.R.'s lot, in the forward area chiefly, to traverse these 'wadis' almost continually. The beds of the 'wadi' are sometimes of a sandy nature, but they are mostly made up of rocks and boulders, or may be likened to a shingly beach in many places. Consequently the going is very rough. I think the most painful ride I have ever had was when I had to traverse a 'wadi' bed for about four miles. Never again do I wish for a repetition of that mode of torture. The bicycle survived the

ordeal, but the rider was severely mauled. Again, there is the descent and the corresponding ascent of these 'wadi' banks, which, in places, are of a mountainous character and very precipitous. But for the three-speed gear and the most essential hand-controlled clutch we should be in the Land of Promise.

"In the line area we usually ride straight across country, hanging on as near to Brigade Headquarters as possible until the point for temporary Brigade Headquarters is reached.

"It is not a picnic following mounted troops across open country, which at the same time is 'debatable territory,' being many miles in front of our lines. Personally, I think it is rather a heavy order taking motor cycles out in this country and expecting them to tackle open country in the same manner that mounted men do. Nevertheless, I must say that the motor bicycles stand up to the terrific gruelling to a degree which is little less than marvellous. Carriers and gear boxes (chiefly second gear pinions) seem to be the weakest point in the machines.

#### Comparative Conditions in France and Palestine.

"I have met quite a sprinkling of D.R.'s who have been on service in France and Flanders, who are now serving out here, and I know by the gist of their comments that they wish themselves back again in France, and are not keen on the motor cycling which obtains on the Palestine Front. I am one of the original Yeomanry D.R.'s who left England in April, 1915, and would like to mention that after repeated applications (extending over a period of two and a half years in some cases) we have all been transferred to the R.E. Signal Service, thus receiving official recognition at last. Some of us have been most unfairly dealt with on transfer. Thus, men who have been D.R.'s since mobilisation, and have been on Foreign Service two and a half years without leave of any description, have been transferred as 'Pioneer M.C.'s.' However, I suppose we must be thankful that we have been noticed at all."



Trouble with the timing gear on the sea shore in Palestine.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

#### MOTORING AT CHRISTMAS TIME.

Sir,—As there are many motorists who will be wanting to visit their friends and families at Christmas, and as we have all been asked to avoid travelling on the railways during the holidays, in order to leave the railways free for the soldiers returning on leave, I would suggest that the Petrol Control Committee be approached with a view to its granting a ten to fourteen days "special" dispensation to all motorists at Christmas, say from 22nd December to 3rd January inclusive.

I am sure this "act of grace" would be most gratefully received by all, especially the munition and war workers, who would doubly enjoy their well-earned holidays.

I do not suggest that new petrol licences be granted, but that those who have petrol obtained from recent licences be able to use it for the period mentioned.

Trusting you will take the matter up with the powers that be,

MOTORIST.

Liverpool.

[In the middle of November we raised this point with Sir Evan Jones, the Petrol Controller, who informed us definitely that no concession to motorists could be made at Christmas time. Presumably it is the desire of the Government to discourage travelling of all kinds during the holidays.—Ed.]

#### A SPORTING CHALLENGE.

Sir,—I should like to reply to "Bogey, M.T., A.S.C.," regarding his claim of 63 m.p.h. for a standard W.D. machine. My own experience of this particular model Triumph dates from January, 1916, and includes fifteen months of daily riding in that delectable zone stretching from Albert to the Belgian Coast. In addition to my own machine, I was responsible for three other W.D. Triumphs. The total mileage of the four machines at the end of the period was quite a substantial figure—quite large enough from which to draw conclusions. The fastest speed obtainable over the kilometre against a watch was 47 m.p.h., on the Arras-St. Pol main road. The gear ratio was  $4\frac{3}{4}$  to 1. Has "Bogey, M.T., A.S.C.," calculated that 63 m.p.h. for a mile on a machine geared 5 to 1 implies approximately 3,850 revs. per minute? Knowing the machine, I make bold to say that the speed is impossible, quite apart from any question of stamina. I believe the fastest speed the makers claim for the machine is 50 m.p.h. The proof of the pudding will be in the eating. Time will show us, in the post-war model engine, whether the makers have as much confidence in their present engine as some people have.

Like Mr. Houlding, I questioned the ability of the standard W.D. 1917 Triumph to put up the strenuous performance it did against the Excelsior, and my question was based on Active Service riding experience.

M.B., Ch.B.

Sir,—I was interested to read Mr. Brough's letter in reference to "A Sporting Challenge," which was reported in the columns of your paper. Your article stated that the Excelsior and sidecar finished the journey 2m. 30s. ahead of its competitor, while Mr. Brough states he finished more than two miles ahead. More than two miles were thus covered in 2m. 30s., which means that more than the last two miles were covered at an average speed of approximately 48 m.p.h. by the 4 h.p. Triumph and sidecar. This part of the journey was the finish and over the most difficult part, including the "test" hill. Messrs. Bayliss, Thomas and Co.'s advertisement on the back cover states the average speed of their machine was 48 m.p.h., and, naturally,

as the last two miles of the journey were the most difficult, then it is reasonable to assume that the speed of their machine was much below the average speed of the whole journey. This certainly weighs very much in the favour of the Triumph machine.

One would have at least expected an 8 h.p. machine to be able to take a sidecar much heavier than the 4 h.p. and then establish a great superiority over its rival, whereas it actually had a sidecar weighing 70 lb. less, or, in other words, the sidecar attached to the 4 h.p. machine weighed about 60% more than that attached to the 8 h.p. machine. This does great credit to the 4 h.p. machine, especially considering the fact that the 4 h.p. was much faster (according to data given) over the most difficult part of the journey.

Another point Mr. Brough labours is that his machine was tuned up at a "country house" while the other had the benefit of a "works," but I suppose that Mr. Brough was perfectly satisfied that the machine was, as the "official record" has it, "in magnificent tune."

The fact is that the superiority of the high-powered twin over the 4 h.p. single-cylinder still remains unproven.

Coventry.

A SPECTATOR.

#### FLYING IN A CURVED PATH.

Sir,—If it really affords Mr. Aston such intense gratification to see his articles on "Flying" discussed in your columns, I feel I cannot deny him the joy of dealing with this present letter. But will your contributor please understand that I appear not as a critic, but merely as a very humble seeker after knowledge? Mr. Aston appears to take such terrifying gusto in "disposing" of his opponents—one pictures him standing amid a group of prostrate antagonists, brandishing defiant fists, and "inviting the world at large to allow him to "take it on"—that I should never dare to approach him except under cover of a particularly large and prominently displayed flag of truce.

If I may now frame my modest request, it is this: In his article of November 15th your contributor states that, "When an aeroplane turns it requires more power from the engine if it is to maintain its altitude unchanged." He then proceeds to explain that the purpose of this extra power output is to supply the force which deflects the machine from its straight path. Are we to understand, then, that it requires a continuous expenditure of power to keep a body travelling in a curved path? If so, evidently Mr. Aston must be conscious of quite a considerable outpouring of energy on his own part, for how otherwise could he achieve that curved path of 4,000 or so miles radius that he traverses once in twenty-four hours?

I was under the impression that the force which deflects a body from a straight path, or maintains it in a curved path, is always exerted *normally* to the direction of motion, hence no expenditure of energy whatever is required to keep the force in operation.

If the article had stated that the reason for the increased engine power in making a turn was the additional head resistance due to the altered disposition of the wings and rudder of the aeroplane, I need not have troubled Mr. Aston for this further elucidation. Although I am ignorant of aero-dynamics, I do know that it is harder work to row a boat in a circle than in a straight line, and the cause is obvious, i.e., the violent eddying and consequent dissipation of energy produced by the rudder. In view of your contributor's severe treatment of people who offer unsound analogies, it might be prudent for me to disclaim any intention of putting the above statement forward as an analogy; and it will be still more prudent for me to retire before I abuse my flag of truce.

DYNE.



## PETROL SUBSTITUTES.

Sir,—A month ago I sent for a "recipe for a really good substitute" for petrol, enclosing P.O. for 1s. I have now given it a fairly good trial and find it a failure. My  $4\frac{1}{2}$  h.p. will not run at all. I adhered to the directions as printed. To give it a further opportunity I ran the engine with petrol first, but when the substitute was turned on the engine stopped, and would not even fire.

I might mention also that methylated spirits is one of the ingredients, a spirit that cannot be obtained here (Wishaw) at any price; but I was able to get the necessary half-pint through a friend.

Perhaps some other motorists may have tried and found it a failure; but I should like to hear from some of your readers who have found it successful.

THOS. BARR.

## FLAT TWINS AND SHORT STROKES.

Sir,—Is not "Capt., R.A.M.C.," making a mistake in your issue of November 8th, when he ascribes the bad pulling of flat twins to their short stroke? Surely the valve timing is what is really responsible.

I know of no flat twin that has been widely used by the public with a shorter stroke than 60 mm. The J.A.P. make a 5 h.p. o.h.v. twin of 85x60 mm., that can be arranged to pull very well at low speeds.

Also is not "Chinook" equally off the map when he ascribes the same failure of his flat twin to the overhead valves? The Maudslay lorry has o.h. valves, and pulls quite well. Also the Buick and a host of other American cars. Surely it is the timing and not the placing of the valves that governs the subject.

Other things being equal, an o.h.v. engine will pull better at slow speeds than any other type of engine; but because overhead valves are usually only fitted (in motor bicycles) with ultra-racing timings, the principle of the overhead valve gets the blame.

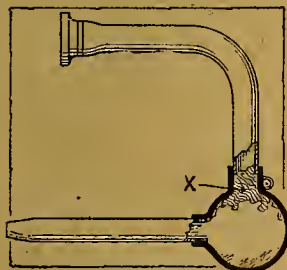
M.T., SUB.

B.E.F.

## LOSS OF POWER.

Sir,—I have noticed at various times in your "Question and Replies" that motor cyclists have suffered loss of power after overhauling the machine, and I wonder how many have suffered from the trouble I had under the same circumstances.

I took my  $2\frac{1}{2}$  h.p. Levis down, overhauled it, and on re-assembling it behaved very badly. It would start well, but not "two-stroke" properly, and at the end of half a mile it would peter out. I took it down again, put in one new ring, made all the joints tight, carefully examined the carburetter and all connections for air leak, and on trying once more found it worse than ever; even half a mile was more than it would do. Only one thing remained, and that was the exhaust pipe. On the Levis, as on most two-strokes, the exhaust is built up, as in sketch. I took it adrift and found an almost complete stoppage at the bottom of the pipe marked X. The carbon (I have been using



A frequent cause of poor running of two-strokes.

half petrol and half substitute for some months) had accumulated there, and when the top portion was scraped out on the first overhaul the scrapings had dropped to this point and made the final closure. On putting the bent pipe in the fire till heated red and then tapping it all over the deposit fell off, and now the machine goes better than it has done for months. Is this deposit in the exhaust usual?

J. FAIRLAM HORN.

[The exhaust pipe is apt to become coated with carbon on any machine, and it is very necessary that this should be removed, especially so in the case of a two-stroke.—Ed.]

## CENTRIFUGAL FORCE.

Sir,—In reply to "Top Heavy," I did not say that centrifugal force and gyroscopic action were the *only* forces that kept a cycle upright. I said that a trick cyclist when stationary *could* keep up on account of mechanical balance and movement of his body. I stated, however, that, judging from the difficulty of keeping up, these forces must be

small. I do not see how centrifugal force or gyroscopic action can possibly fail to act. How does "Top Heavy" explain the phenomenon of a cycle going round a corner if he denies centrifugal force? He must be aware that a cycle "banks" when rounding a corner. Thus the centre of gravity is considerably to one side of the wheelbase all the time during the "bank." Centrifugal force *must* act to preserve equilibrium. A study of the "triangle of forces" in mechanics will prove this point. Also, if he denies gyroscopic action, how does he explain the fact that a cycle can go much straighter and with fewer wobbles when going fast than it can when going slowly? This tendency to keep straight is so marked when going fast that it is possible to ride with "hands off" and yet make no conscious effort to keep up, beyond sitting still. Also, a motor cycle, on account of its greater speed, heavier wheels, and presence of an engine flywheel, and, as a result of all these, increased gyroscopic action, is a far steadier mount than a push-cycle.

I should like to refer "Top Heavy" to my experiment with the cycle wheel. In conclusion, I for one would be very much obliged to "Mohandis" if he would pass judgment on this point when convenient.

G.R.B.

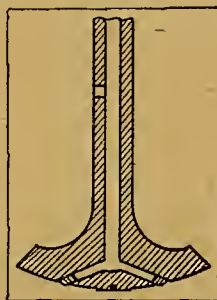
## EXHAUST POPPET VALVE DESIGN.

Sir,—The case of fig. 1 in "Engro's" article, where the valve stem extends through the valve cap, appears to me to be impracticable, owing to the difficulty in making the gland in the valve cap compression-tight.

The main theme in all these designs seems to be the cooling of the exhaust valve; but am I not right in supposing that if a valve such as that in fig. 2 he used the mixture would be affected, owing to the air being drawn through the valve stem into the compression chamber on each suction stroke?

I should like to hear "Engro's" opinion of an ordinary overhead poppet valve with a hollow stem, but the ends of the holes plugged up. The accompanying sketch will explain my meaning better. An adjusting screw could also be fitted on top of the port for tensioning the valve spring.

P. E. DAVY, Cpl. R.E., D.R.



Cpl. P. E. Davy's design of an overhead poppet valve with hollow stem.

Sir,—I think "Olivos" must have had some curious timing in his engine with De Lissa valves that they should cause popping back owing to the springs being too weak to overcome the inertia of the valves at full lift.

The springs fitted to these valves are necessarily much stronger than with the ordinary type of valve, and it is impossible for any lagging to occur. I have run a  $3\frac{1}{2}$  h.p. Motosacoche for many thousands of miles, and popping occurs only when the engine speed is too low for the load on the engine, and never at high speeds; in other words, they act somewhat as safety valves, and retarding the spark stops the popping at once unless a change down is called for. The popping is caused by the same circumstances which give rise to knocking in other engines, and is quite harmless. I have never yet been able to make my engine knock; the valves will not allow it. If the popping cannot be cured by retarding the spark, it indicates that grinding in is necessary. This should be done with great care, and the makers' instructions followed implicitly. When once the valves are properly ground in and the springs adjusted, the valves require no attention whatever for much longer periods than the ordinary type.

I think it is fairly clear that "Olivos" did not take the trouble to get his valves working properly, but tried to cure the popping by screwing up the spring adjustment—a fatal thing to do, and, unfortunately, perhaps, a very simple matter.

I do not think these valves have been developed as they deserve, due, perhaps, to the conservative ideas of the public. I believe I am right in saying that the De Lissa valves on the  $3\frac{1}{2}$  h.p. M.A.G. are operated by the same size rockers as were fitted to the previous engines with the ordinary type of valves. A careless owner who promptly screws up his spring adjustment as soon as popping occurs may easily involve himself with broken rockers



The hard work these engines get through without attention is extraordinary and their reliability unfailing. Overheating I have never experienced, except very slightly when the engine is badly carbonised.

My machine is a four-year-old model, and I always run with a coachbuilt sidecar and passenger, and have completed this summer's running without an involuntary stop bar one puncture, and it is twelve months since I decarbonised and ground in the valves. Usual disclaimer. D.L.E.

London, S.E.

#### STRENGTH OF MATERIALS.

Sir,—I would like to correct one point in the article on strength of materials. The

point to which I refer is the extension diagram, fig. 2. The correct diagram is something like the appended sketch.

After developing a local extension the load gets less, but the bar goes on extending till fracture occurs. I should be pleased to furnish results of actual tests, taken by myself, if required.

Dewsbury.

A.C.C.

[We should be glad to receive the results mentioned by our correspondent.—En.]

#### FLYING FACTS AND THEORIES.

Sir,—I read in your issue of November 15th an article by Mr. W. G. Aston, A.M.I.A.E., on "Flying Facts and Theories," in which he observes that "O.J.F.S., Lt. R.F.C.," is alone in upholding that turning an aeroplane "up wind" and "down wind" are different operations.

I think that anyone with a little aeronautical knowledge will agree that "O.J.F.S." is quite reasonable in stating that a machine will stall more easily turning "down wind" than "up wind."

I am afraid that Mr. Aston lets himself down by comparing the cyclist on the ship's deck with the machine in the air, for he states that the cyclist only bothers himself about his speed *relative to the ship*, and yet suggests that the pilot should not consider his speed *relative to the "moving object"* on which he is travelling, *i.e.*, the wind, but his *ground* speed. [Our correspondent has entirely failed to grasp Mr. Aston's meaning. The movement relative to the air is exactly what he states to be all important.—En.]

Mr. Aston must know that centrifugal force increases with the velocity of the revolving object; therefore, at such a comparatively low speed of 8 m.p.h., centrifugal force need hardly be taken into account.

Regarding his statement that an aeroplane does not recognise such a thing as wind, I think this is ridiculous, as a machine must "meet" the wind to enable it to sustain itself. For instance, a boy's kite will only rise "with the wind" if one runs along the ground fast enough to cause a pressure on the front side of the kite, instead of the back, as would be the case if the kite were held stationary in the same direction. Obviously an aeroplane must work on the same lines, and overtake a "down wind," otherwise it will stall.

I hope that Mr. Aston will be convinced that "O.J.F.S." is correct in his statements.

Cardiff.

A. E. BRITAIN, R.F.C.

#### THE FAVOURED TAXI.

Sir,—Why so much favour to the taxi—the conveyance of the "idle rich"? No doubt a taxi is occasionally exceedingly useful; for example, at a railway station when one has luggage. But taxis exist only where other means of locomotion are available, and therefore they are not nearly so needful as the car and the motor cycle, where these are the only means of conveyance—many of us parted with our horses when they were needed for the war. Is this favour shown to the taxi because our legislators and officials in London cannot stoop to the use of the convenient underground or the humble 'bus? This class prejudice would also explain why half-empty first-class carriages are retained on our hopelessly congested railways. Why can I do shopping in London or Birmingham by taxi if it is unpatriotic and criminal to use petrol for shopping in a country town? Let me give a possible instance of this preferential treatment. I cannot legally drive my Morgan to call on a friend or to take my wife shopping to Hereford. I do not in the least complain. There is a war going on, and it is absurd to expect that we can do as we did in pre-war times. But the absurdity is that—if I do not mind the expense—I can hire a taxi from Hereford to take me there and bring me back. My Morgan would use a little over one-third of a gallon for the double journey; the taxi would have to do the double journey twice, and would use at least two gallons—the town is ten miles distant. A very pertinent question was asked in the House the other day by Mr. Houston (Liverpool), "If the use of a motor car means less petrol than a taxicab, is not that a matter of economy?" The reply was cryptic, "That is a matter for the court." One does not know what court is qualified to decide a matter of economy, but the answer, I suppose, is a variant of the official reply, "The Department cannot undertake to advise applicants on the interpretation of the terms of this Order."

Stoke Lacy.

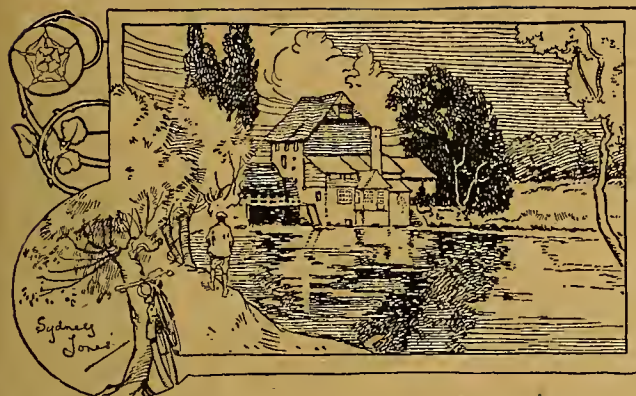
H. GEORGE MORGAN.



THE TANK IN TRAFALGAR SQUARE.

The admiring crowd round the Tank and trophies. The small building in the background is where the Bonds and Certificates are sold.





## THE CHEMISTRY OF THE INTERNAL COMBUSTION ENGINE.

A Review of Various Fuels possible  
for Motor Cycle Use.

IN these days of petrol scarcity, the subject of alternative fuels is discussed in every paper connected with the internal combustion motor. The aim of this article is to collect together data from which to review the various fuels as power producers.

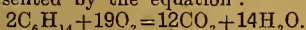
The production of power is brought about by the explosion of a gaseous mixture, the resulting pressure being converted into work by means of a movable piston. The production of pressure is due to two things:

1. The heat of combustion of the fuel causing the gases to expand.

2. The greater volume of the products of explosion, considered at the same temperature as the explosive mixture.

In all perfect combustions, carbon is converted to carbon di-oxide ( $\text{CO}_2$ ) and hydrogen to steam.

In the case of petrol, which can be represented very nearly by the chemical formula  $\text{C}_8\text{H}_{18}$ , the reaction can be represented by the equation:



Since air contains one-fifth of its volume of oxygen, 2 volumes petrol vapour + 95 volumes air = 12 volumes  $\text{CO}_2$  + 14 volumes steam + 76 volumes nitrogen, i.e., 97 volumes produce 102 volumes.

That is, there is 5.2% increase in volume, or, since at the moment of explosion the piston can be considered to be stationary, there will be an increase in pressure of 5.2%.

With benzole this figure is 4%, and alcohol 6.5%.

Since gases expand in proportion to the heat produced, and the work done is directly dependent on the gas expansion, Work done = fuel consumed  $\times$  heat generated per unit of fuel combusted.

The amount of fuel used depends on cylinder capacity and throttle opening, both of which are purely relative and variable factors; consequently to get a fundamental comparison, the point to be considered is the heat evolved per unit of fuel consumed.

The technical unit used in this country in connection with thermal considerations is the British thermal unit per lb. of fuel. A B.Th.U. is the amount of heat needed to raise the temperature of 1 lb. of water through  $1^\circ$  Fahrenheit.

Comparing different fuels, those with the highest B.Th.U.'s will be expected to give the most power, *ceteris paribus*; but, as will be seen later, other factors

enter into consideration, which are of equal importance to calorific value. Were it not so, there would be no ground for argument as to the best fuel; it would be the one with the most B.Th.U.'s per lb.

Since the majority of fuels are liquid, it is of more interest if the B.Th.U.'s per gallon are compared:

Fuel.	Specific Gravity.	B.Th.U. Per lb.	B.Th.U. Per gal.
Pratt's Perfection ..	.706	19,960	141,200
Pratt's No. 2 .....	.713	—	—
Pratt's Taxibus ....	.722	20,080	154,300
Mex .....	.718	20,760	149,400
Benzole .....	.875	17,780	155,900
Paraffin .....	.800	18,610	149,200
Alcohol (industrial) ..	.819	11,000	90,340

### Gaseous Fuels.

By these figures it is clearly shown that benzole gives the most power per gallon.

As gaseous fuels have now come to the fore, it is of interest to compare these with liquid fuels; the only ones suggested and tried are coal gas and acetylene.

Coal gas ....	500 B.Th.U. cubic foot.
Acetylene ....	1,500 " "

The following table shows the comparison with liquid fuels:

Liquid Fuel.	1 Gallon Equivalent in Coal Gas in Cubic Feet.	1 Gallon Equivalent in Acetylene in Cubic Feet.
Petrol .....	285	95
Benzole .....	310	104
Paraffin .....	298	99

Considering acetylene, it is found that good commercial carbide yields 5 cubic feet of gas per lb.; therefore the equivalent of one gallon of petrol is 19 lbs. of carbide, which will require one gallon of water; these figures show that it would be too unwieldy to run motor cycles on acetylene.

Gas engines have been run on acetylene by Mr. Frederick Grover, A.M.I.C.E., who found it was not a paying proposition unless carbide cost £4 per ton or under; he also found that the pressures produced were two-three times that with coal gas. With compression ratio of 3, pressures up to 200 lbs. per square inch were obtained.

There is one solid fuel which is worthy of mention, and that is naphthalene. It is cheap, and gives 16,790 B.Th.U. per lb., that is, about  $8\frac{1}{2}$  lbs. of naphthalene are equivalent to a gallon of petrol. It is comparatively volatile, and would give an explosive mixture if hot air were passed through it; the chief objection would be the liability to carbonisation of the cylinder.

### The Question of Volatility.

Another consideration in the case of liquid fuel is volatility; and concerning fuels as a whole, the temperature of ignition, range of explosive mixture, and carbon production are important points.

All liquid fuels, except pure benzole, are mixtures of several individual constituents, and consequently they distill over considerable ranges of temperature. The low boiling fractions are most easily volatilised, consequently those fuels which start to distill at the lowest temperatures will be those which give easy starting from cold.

Fuel.	Range of Distillation.
Pratt's Special .....	52—135°C.
Pratt's Perfection ....	50—115°C.
Shell .....	57—138°C.
War petrol .....	62—148°C.
Alcohol (industrial) ....	78—90°C.
Pure benzole .....	80—81°C.
Motor benzole .....	81—106°C.
Paraffin .....	130—275°C.

The above list explains why (1) it is harder to start on war petrol, (2) it is harder to start on benzole, (3) it is necessary to start on petrol or methylated spirit, when using paraffin.

In this connection it is of interest to note that all sorts of patent fuels have been brought out in America, which have a paraffin basis, to which is added a low boiling substance, which will give easy starting, thus doing away with the dual fuel method.

Thus U.S. Patent No. 1,230,924 consists of—

Paraffin .....	1 gallon.
Methylated ether ..	4 oz.
Carbon bisulphide ..	8 oz.

Since ether boils at  $35^\circ\text{C}$ ., and carbon bisulphide at  $46^\circ\text{C}$ ., easy starting would be assured. The object of the latter substance is not clear, since it gives rise to sulphur dioxide on combustion, which has an injurious effect on the lubricating oil and metal.

In fuel considerations there is a property, known as the temperature of spontaneous ignition, which is determined by dropping the fuel on to a heated surface, the temperature of which is measured and continually raised until ignition takes place; the temperature at which this occurs is the temperature of spontaneous ignition. Since with ordinary carburettors drops of liquid fuel are drawn into the cylinder (chiefly the higher boiling fractions), if the temperature of any part of the cylinder or valves exceeds the temperature of spontaneous ignition of the fuel in use, pre-ignition takes place, which results in knocking.



## The Chemistry of the Internal Combustion Engine.—

The figures for the commoner fuels are—

Fuel	Temperature of Spontaneous Ignition (Holm).
Petrol .....	415°C.
Paraffin .....	380°C.
Benzole .....	520°C.
Alcohol .....	510°C.

Again practice is confirmed by theory, namely, that benzole gives the least "konking" and paraffin the most.

Since a dull red heat corresponds to about 700° C., it will be realised that temperatures such as the above will easily be attained at the hotter portions of the engine, such as plug points, exhaust ports and valves.

The actual ignition temperature of a gasified mixture of fuel and air is 100-200° C. higher than the temperature of spontaneous ignition, but, since in practice the charge drawn into the cylinder contains both gaseous and liquid fuels, the factor of spontaneous ignition cannot be neglected.

It is obvious that with fuel and air mixtures limits will be reached at which they are too weak or too rich to explode; the width of range over which explosive mixtures exist will give a measure of elasticity, and will tend to slow running.

Fuel	Limits of Explosive Mixtures with Air. Percentage of Fuel by Volume.
Petrol .....	2.0-6.0
Benzole .....	2.7-6.3
Alcohol .....	4.0-13.7
Coal gas .....	6.0-19
Acetylene .....	3.5-52.5

It will be seen that petrol and benzole are about the same, but acetylene has a very wide range.

## Analysing the Exhaust Gases.

It has been generally stated in motor-ing papers that the greater carbon deposit experienced with benzole is due to insufficient extra air; in many cases it is true, but the real reason is purely chemical. Benzole belongs to what is known as the "unsaturated" hydrocarbons, and these are all subject to formation of carbon at high temperatures owing to what is known as "cracking" or superheating. This certainly is an objection to benzole, but should not occur to such an extent with water-cooled engines.

As was pointed out at the beginning of this article, combustion of hydrocarbons with the requisite amount of air gives rise to the formation of carbon di-oxide and steam, which form the exhaust gases. If insufficient air be present, the hydrogen, having greater affinity, gets its full share, and the carbon has to go short, resulting in the formation of carbon mon-oxide, or even free carbon.

## An Analogy from Boiler Recorders.

All up-to-date boiler plants are fitted with automatic recorders, which analyse the flue gases every few minutes, and record the result of analysis on a revolving drum. The flue gases should show between 10-12% of CO<sub>2</sub>; if carbon mon-oxide is present it shows that insufficient air is being admitted to the furnace.

If the CO<sub>2</sub> valve is low, it shows that excess air is getting through, due to faulty setting, leaky dampers, or holes in the firebed: this all results in loss of heat and efficiency.

In the same way, analysis of the exhaust gases of an internal combustion engine will show whether there is proper carburation. Low CO<sub>2</sub> shows leaky valve guides, or too weak a mixture; presence of carbon mon-oxide shows too rich a mixture.

## Practical Application.

The theoretical limit of CO<sub>2</sub> in the exhaust gases from petrol is 13.5%, benzole 16.5%, and can be calculated for any other fuel.

It is a matter of the most detailed adjustment to get the figure up to the limit, and the nearer one gets to it, the more efficient will the engine become and the maximum of power be obtained.

The method of application for the scientific motor cyclist would be to fit a small continuous sampling device to the exhaust pipe; have the machine running under the conditions required, then start the sampler. At the end of the test it is shut off, and the gas obtained is analysed on reaching home. The resulting figures will show the necessary adjustments to be made to the carburetter. This method would be particularly valuable for two-strokes, as it would indicate whether unconsumed fuel was going through to the exhaust.

I have little doubt that in car racing and tuning, where things are not done so much by rule of thumb, but where the slide rule, the chemist and the metallurgist are brought into use, methods of this sort prevail; it remains for the motor cyclist to take a more intelligent interest in the fundamentals of his engine, and production of power.

S. E. Fox.

# WHAT IS A CARBURETTER?

THIS may seem a rather startling heading for an article in a sober technical journal, but it was forcibly brought to our notice the other day that many motorists have quite an inadequate idea as to the correct meaning of the word "carburation." The average motorist would assert quite confidently that a carburetter is an instrument for vaporising the liquid fuel used in the motor, and for—incidentally—mixing air with this fuel. Ruskin, in his "Sesame and Lilies," first published in 1865, refers to carburetted hydrogen. This, of course, is obviously absurd if carburetting meant the same to Ruskin as it does to the everyday motorist at the present time, but Ruskin was not the man to use a word inaccurately. By carburetted hydrogen he meant coal gas, and he was perfectly correct in referring to it by this name, for to carburet a thing means to impregnate it with carbon. Coal gas is, of course, primarily, hydrogen impregnated with carbon. Carburetting, then, means the thorough mixture of any substance with carbon; the substance and the carbon would necessarily be in the gaseous state.

## The Coal Gas Carburetter.

This makes it fairly clear that a carburetter is an instrument for impregnating air with a fuel containing carbon,

and that consequently the vaporising properties of the carburetter are really



IN "GERMAN" EAST AFRICA.

A newly-made roadway through the bush, not far away from the scene of the recent success in that country. D.R.'s have to traverse these forest roads.

quite incidentals. The use of the word carburetter, however, has become generally distorted amongst motorists, and we intend deliberately to depart from the original meaning of the word and to use it always in its generally accepted sense, i.e., an instrument that vaporises a liquid hydro-carbon fuel and then mixes this fuel with a certain amount of air. Similarly, by carburation we shall understand not only the mixing of the fuel with the air, or the actual carburation, but also the previous vaporising of a liquid fuel. With this meaning of the word it would strictly, of course, be rather inconsistent to refer to such a thing as a carburetter for coal gas, because coal gas is not vaporised in the instrument. We intend, however, to allow ourselves what we consider a pardonable latitude, and to speak of a coal gas carburetter with the tacit understanding that the vaporising function of the instrument is lacking.

## "Carburetting a Fuel."

Incidentally, we may refer to the fact that it has been very common practice for some time to speak of carburetting a fuel. This use of the word is hopelessly unjustifiable, for if a fuel consists of hydrocarbons it is, of course, already carburetted, and what a carburetter does is to carburet the air, not the fuel.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from question, bearing on technical subjects.

## Petrol for Clergymen.

**Q.** Could you please give me information on the following subject? My father is a clergyman, and frequently on Sundays I take him out to neighbouring villages (no other means of conveyance being available) on the back of my motor cycle to preach. Can I continue to do this now without infringing the new law, and shall I have to get a certificate from the Petrol Controller to do this?—G.R.R.

If the Petrol Controller will issue a new licence to you after you have stated for what purpose you intend to use your machine, there would certainly be no objection to your taking your father to preach, as you say. It is, however, very doubtful whether the Petrol Controller will issue you a new licence for this purpose.

## Difficulty in Starting.

**Q.** I have great difficulty in starting my motor bicycle, which is a 1915 2½ h.p. Calthorpe-Jap, fitted with an Amac carburetter. The engine will give about a dozen explosions and then stop. On removing the sparking plug I find the points and the electrode all wet with petrol. If I heat the plug in a gas flame it will start right away without the least trouble. (1.) Does the carburetter require a smaller jet; the present one is marked 26? (2.) The collar on the float needle is about ¼ in. from the split pin which is on top of the float. Does this collar require moving? (3.) Should the top of the spray holes and slides be dry? These, I notice, are very wet. I might say that I fitted a new float needle a day or two ago with no better results. When the engine gets running and fairly warm it gives no trouble whatever. I have this difficulty only when it is cold. I have had the collar on the float needle in various positions, but with no better result.—J.O.

(1.) The fact that the sparking plug points get wet with petrol merely indicates that the charge is not being fired. We do not think that a smaller jet would cure the trouble. Possibly there is a defect in the magneto, or the sparking plug gap is a shade too close, and you do not get quite a hot enough spark to fire the charge. Air leaks at the carburetter or induction pipe unions would cause the trouble. (2.) We do not think for a moment that the level in the carburetter is incorrect. Do not interfere with the collar. (3.) The fact that the

tops of the spray holes are wet with petrol may be caused by a leakage at the needle valve. The new needle would not cure this, as it is bound to occur after flooding. We think that your difficulties are more likely to be due to the present-day inferior petrol, and fear that they will continue during the cold weather. You could get easier starting by wrapping rag soaked in boiling water round the induction pipe before attempting to start.

## Petrol for Health Rides.

**Q.** I should be pleased if you could tell me how I stand with regard to the new motor Order *re* joy-rides. I have a sidecar machine and six gallons of petrol and paraffin mixed, which has been in stock a long time, formerly the property of my brother, killed in the Battle of Jutland. Now my wife was in an air raid on the East Coast a short time ago, and spent five weeks in hospital; consequently she is in delicate health. A motor cycle ride does her an immense amount of good, and is recommended by her doctor. Do you think I could still run the machine, if I get a doctor's certificate to that effect, until the stock of spirit has run out? If so, to whom should I make the application?—J.W.O.B.

If you can get a doctor's certificate to state that sidecar riding is essential for your wife's recovery we think there should be no difficulty about your being allowed to use the machine. Otherwise, the use of liquid fuel in a motor cycle, except on work of national importance, is prohibited by the latest edict of the Petrol Controller.

## Damage by Straying Ponies.

**Q.** On October 21st I was going for a ride on my motor cycle at 11 a.m., and while going between Beaufort and Brynmawr eight or nine mountain ponies came down on the main road from between some houses, and came straight across the road just as I arrived on the scene. The result was that I was thrown from my machine, and have not worked since; also my machine was damaged. I have a few witnesses to prove that the fault was not mine, nor am I in any way to be blamed. What I want to know is: Can I claim damages from the owner of the pony, or can he claim against me for damage to his pony?—A.H.

Your chances of success in an action against the owner of the ponies would depend entirely on such evidence as you could bring forward in the court to prove that he was responsible for the action of the ponies that caused the accident. You would have to prove that the ponies were straying on the road as the result of negligence on the part of their owner or on the part of someone in his employ. Similarly, if he wished to claim damages against you for damage done to his pony, he would have to prove that you were driving in a negligent manner, and that you could reasonably have avoided running into the animals. These actions in a court of law generally result in favour of the owner of the animals. If, however, you have witnesses, and he has none, you stand a good chance of getting compensation, but whether an action is likely to prove a paying speculation is a questionable point.



THE SPANISH "T.T." RACES. A snapshot taken during the race recently held for the King of Spain's Cup, showing Cappel, the winner, rounding a sharp bend.



**Excessive Petrol Consumption.**

**?** (1.) I have a new 1917 model W three-speed Douglas, and have not been able to obtain more than fifty miles to the gallon of petrol. The carburettor is an Amac, jet 27. There is no flooding of the carburettor, and the engine starts immediately from cold. I always give as much air as the engine will take. The tappets appear to have the correct clearance. (2.) When the clutch is fully lifted the machine still moves, unless I apply the brake. Any further shortening of the Bowden wire adjustment causes the clutch to slip.—R.G.

(1.) We should recommend you to get hold of the maker's booklet, and check your timing by this. If the timing is late, then you will get an increase in petrol consumption; also make sure that there are no leaks in the tank or at the petrol pipe unions. (2.) The clutch is not yet bedded down to its work, and there is no doubt that the trouble will right itself in due course, that is to say, after the machine has been in use a time.

**Washing out the Crank Case.**

**?** I have just bought a new 2½ h.p. Calthorpe-Jap, fitted with a two-speed Enfield gear. (1.) There is a drain plug at the bottom of the crank case. Should I open this to let out the oil, as I have been told to use plenty while the engine is new, and I let it run nearly continuously at the sight feed? (2.) The engine stopped the other day, and would not fire, and I found that the plug was broken at the porcelain and the pieces round the points. I fitted a new plug, and the machine now runs perfectly. If any pieces of porcelain have dropped inside, how could I get them out? (3.) How should I oil the magneto driving gear? I do not see any place for it.—P.B.W.

(1.) The drain plug should be used only when you want to drain and wash out the crank case. You may do this at the end of the first 250 miles, but after that every 500 or 1,000 miles is often enough. When the crank case has been emptied about three full charges of oil should be inserted. Normally, the oil is used

up as you go on. (2.) All you could do would be to take the cylinder off if you suspect there are pieces of porcelain inside. (3.) Simply remove the case and put a little graphite grease on the drive. On many machines the magneto drive is oiled from the engine.

**The Rule of the Road.**

**?** (1.) The driver of a motor car or motor cycle wishes to pass a stationary tramcar about to go in the same direction as himself. Does he pass it on the near or on the off side? (2.) Apparently the Highways Act of 1835 (?), which says that all vehicles should pass on the off side, has not been amended to apply to tramways. Is this so?—B.E.F.

(1.) The driver of a motor car or motor cycle may pass a stationary tramcar on either side, except, we believe, in Edinburgh, where there are local restrictions enforcing him to keep to the near side. (2.) We are unaware that the Highways Act has been amended, but the fact remains that in nearly all cases a tramcar may be passed on whichever side is the more convenient to the driver.

**Two-stroke Oiling.**

**?** (1.) A few weeks ago I bought a second-hand two-stroke machine, which is all right in every respect, except that it is a perfect glutton for petrol (about eighteen miles to the gallon). I have altered the level as low as advisable. This improved it a little, yet it is doubtful if I could get thirty miles to the gallon even now. Have tried a smaller jet with no effect. (2.) If lubrication oil is mixed with petrol, what proportions should be used?—A.N.

(1.) From the symptoms you describe we should imagine that you have a serious leakage of fuel somewhere. You do not say if you have been over the fuel feed system carefully. (2.) The machine should be equipped with a small measure, so that you may know exactly how much oil to put in the tank with a gallon of petrol. Roughly the amount is half a pint of oil to one gallon of petrol. Running on a petrol mixture will enable you to locate your petrol leak.

**To Mitigate Skidding.**

**?** I ride a 2½ h.p. two-speed Douglas in all sorts of weather and on all conditions of roads. Last week I had a nasty spill through the machine skidding on a greasy surface. Can you kindly tell me of anything that will act as a safeguard against this trouble, or which will at least give comparative safety in winter riding? The tyre treads are good. Do you think the attachment of a very light kind of sidecar would improve matters, or would it be too much strain on the engine?—G.L.B.

Your fitting a light sidecar frame to the machine would act as a safeguard against the trouble of skidding in winter weather. It would, however, take something off the power and speed of the machine on hills or against stiff winds when the road surfaces are heavy, and we are afraid you would find the danger of the sidecar lifting even greater than that of a side slip.

**RECOMMENDED ROUTES.**

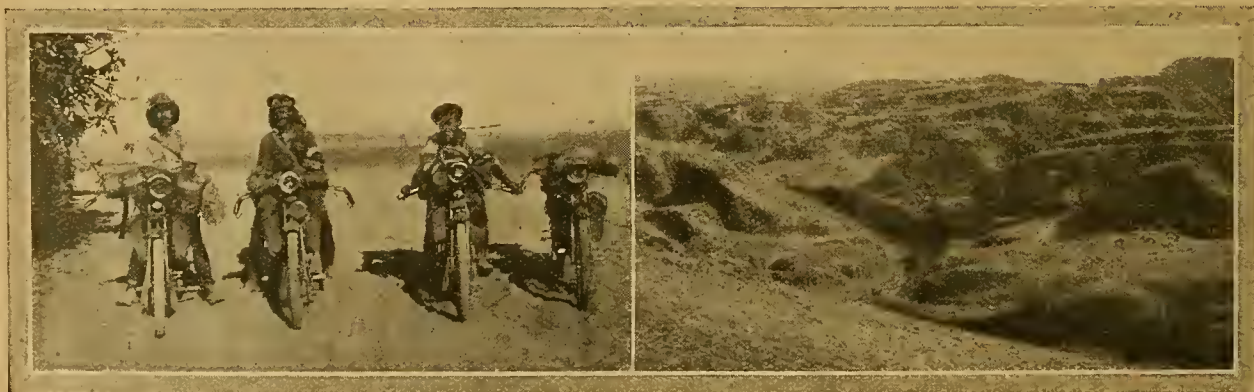
**TRING TO HUNTINGDON.—B.M.**  
Tring, Dunstable, Bedford, Eaton Socon, Great Paxton, Huntingdon.

**AXBRIDGE TO UPAVON.—D.S.W.**  
Axbridge, Wells, Shepton Mallet, Frome, Westbury, Market Lavington, Upavon. Approximately 60 miles.

**AMERSHAM TO SHOREHAM.—E.G.P.**  
Amersham, Beaconsfield, Slough, Windsor, Staines, Chertsey, Guildford, Cranleigh, Horsham, Steyning, West Grinstead, Shoreham.

**STOURBRIDGE TO BLACKPOOL.—A.T.**  
Stourbridge, Bridgnorth, Wellington, Hodnet, Whitchurch, Tarporley, Warrington, Newton-le-Willows, Wigan, Preston, Blackpool.

**IPSWICH TO LEEDS.—C.D.**  
Ipswich, Needham Market, Ixworth, Thetford, Stoke Ferry, King's Lynn, Long Sutton, Wigtoft, Swineshead, Sleaford, Leadenham, Newark, Tuxford, Retford, Doncaster, Pontefract, Leeds.

**D.R.'s IN PALESTINE.**

D.R.'s of the — Mtd. Sigs. R.E. "on trek." Reading left to right: Cpl. A. C. Webb, Cpl. T. N. Hedges, Cpl. B. A. Sleath.

A typical picture of real "wadi" country, which has the appearance of a crater of an extinct volcano. D.R.'s use the track in the foreground.



# C.A.V. Magnetos

BRITISH THROUGHOUT

## The First in favour because the Best in Practice

*What others say —*

### 5,000

Miles Without  
a Hitch.

"I have one of your Magnetos fitted to my motor cycle. I have done over 5,000 miles with it. I have not greased or oiled it."

C. E. Masters, R.N.V.R.,  
Ascott-under-Wychwood, Oxon.

**C.A. Vandervell & Co. Ltd.**  
ACTON, LONDON, W. 3.  
PARIS - BIRMINGHAM - DUBLIN - MANCHESTER

*Members of the British Ignition  
Apparatus Association.*

## ALBION

GEARS FOR  
LIGHTWEIGHTS.

ALBION ENGINEERING CO., LTD.,  
Upper Highgate St., BIRMINGHAM.

### For SOLDIERS and SAILORS DEAFENED IN THE WAR

—to fit them to adopt suitable occupations by which they may earn comfortable livelihoods among their own people, free from barrack-like surroundings — the treasurers of the

**Sir FREDERICK MILNER HOSTELS  
for DEAFENED SOLDIERS**

appeal for funds. Leaflet describing the work post free on application to the Hon. Secretary at Headquarters,  
26, WILTON CRESCENT, LONDON, S.W.1.

*[If you know of a deafened soldier or sailor who is not in touch with us, please ask him to write for information as to what we can do for him.]*

Established 1897.

## Bowden Wire Ltd. London

Victoria Road,  
Willesden  
Junction,  
N.W.10.

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

*In answering these advertisements it is desirable to mention "The Motor Cycle."*

Godbolds

A19



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd., and crossed** & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on-replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**ABINGDON** King Dick, 3 1/2 h.p., 2 speeds, free engine, handle starter; real bargain; must sell; owner joining up; £17/10.—17, Goldhawk Rd., Shepherd's Bush, London. [X9684]

### A.J.S.

**A.J.S.** Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X9688]

**A.J.S.** 6 h.p. 1914 Combination, perfect order; £52 bargain.—Tewnsend, Chaplo Farm, Crick, Rugby. [X9235]

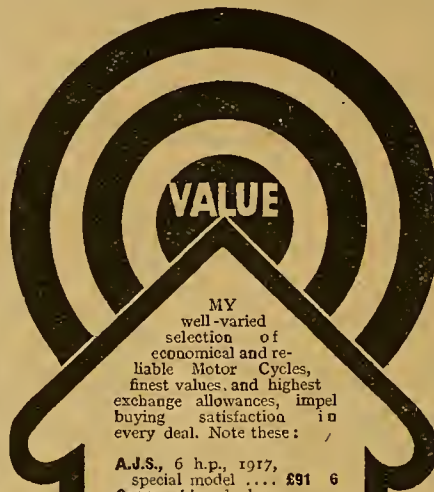
**A.J.S.** 6 h.p., end sidcar, one of the last 1915 models; turned out; price only 75 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [X9351]

**A.J.S.** 2-speed, clutch, and K.S., aluminium foot-boards; £37/15; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9424]

**6 h.p. A.J.S.**, and sidcar, late 1913, in perfect condition, tyres practically new, electric lighting, 3 lamps; any trial; £55.—V. H. Ball, Oakhill Villa, Stoke-on-Trent. [X9365]

**A.J.S. Motor Cycles.**—Immediate delivery of special 1917 model, complete, detachable wheels, 700x80 tyres; £91/6.—P. J. Evans, Sole Birmingham Agent, 87-91, John Bright St., Birmingham. [X1275]

**A.J.S. Motor Cycles.**—Immediate delivery of special 1917 model, complete, detachable wheels, 700x80 tyres; £91/6.—P. J. Evans, 87-91, John Bright St. Sole agent for Birmingham and district. [X8686]



MY well-varied selection of economical and reliable Motor Cycles, finest values, and highest exchange allowances, impel buying satisfaction in every deal. Note these:

A.J.S., 6 h.p., 1917, special model	£91 6
Connaught, 2 1/2 h.p., 2-stroke	£28 17 6
Connaught, 2 1/2 h.p., 2-speed	£36 6
Enfield, 2 1/2 h.p., 2-sp., 2-stroke	42 gns.
Enfield, 3 h.p., twin 2-speed	55 gns.
Enfield Combination	90 gns.
James, 4 1/2 h.p., 3-sp.	£79 0
James, 4 1/2 h.p., 3-sp., complete with S-car	£99 0
James, 3 1/2 h.p., 3-sp., twin	£79 0
James, 6 h.p., 3-sp., kick-start	£84 0
James, 3 1/2 h.p., 3-sp., twin T.T. type	£79 0
James, 2 1/2 h.p., 2-sp., 2-stroke	£50 0
New Imperial, 2 1/2 h.p., 2-speed	£40 19
New Imperial, 2 1/2 h.p., clutch	£48 6
New Imperial, Lady's	£50 8
Norton, 1917, special, 4 h.p., 3-speed	75 gns.
Rover, 3 1/2 h.p., 3-sp.	£80 0
Rover, 3 1/2 h.p., with hand cont. Philipson pulley	£67 10
Rover, 3 1/2 h.p., T.T.	£82 10
Rover 5-6 h.p. twin	£97 10
Rover 5-6 h.p. twin, coachbuilt Sidcar	£124 5
Calthorpe-Jap., 2-sp.	£39 18
Calthorpe, 2-str., 2-sp.	34 gns.
Calthorpe, lady's, 2-sp	£37 10

Choose your "top-value" mount—any time before 1 p.m. Sats. Deliveries prompt.

## P. J. EVANS,

87-91, John Bright Street  
BIRMINGHAM.

'Phone: Mid 662.  
Wires: 'Lytear, Birmingham



No. 74.  
Post Free,  
3/6  
Net.

and Plated.

**VEVO** THREE SPOUT INJECTOR

Polished

and Plated.

For

Injecting

Grease and

Heavy Oil into

Gear

Cases, Hubs, etc. A most

useful article for all

mechanics.

Thousands are being supplied to

the Government.

Vevo Works, PARK LANE,

BIRMINGHAM.

## IMPORTANT NOTICE.

Owing to the Christmas Holidays, the issue of "The Motor Cycle" for Dec. 20th must be closed for press earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, Dec. 13th.

## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**A.J.S.**, 2 1/2 h.p., new, as delivered Dec., 1916, speedometer, horn, mirror; can be seen; 52 gns.—Dr. Scott, 2, Rectory Terrace, Sunderland. [X9380]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1916 A.J.S. De Luxe combination, hood, screen, spare wheel, etc.; 99 gns. (D) [2001]

**2 1/2 h.p. A.J.S. Motor Cycle**, 1912, 2-speed, free engine, practically new tyres, spares, tools, lamps, in excellent condition; £15.—Kimpston, Ashton-under-Hill, near Tewkesbury. [X9283]

**A.J.S.**, March, 1916, 4 h.p. twin, Rudge 16 in. sidecar, splendid condition, not run 750 miles, due owner's illness; £70; cycle separately £60.—Lt. Muir, Thornbank, Lymm, Cheshire. [X9287]

**A.J.S.**, 2 1/2 h.p., 2-speed, K.S., enclosed chains, tyres and condition perfect; £37; exchanges entertained; consider lady's and gent's cycles part.—Cpl. Tawinner, A.M.T.S., Bhairpore, Tidworth. [X9251]

**2 1/2 h.p. A.J.S.**, 1915, 3-speed model, countershaft gear, chain drive transmission, includes accessories, hand clutch, kick start; £37/10; guaranteed.—Wanchope's, 9, Shoe Lane, Fleet St., London. [1904]

### Alldays.

**ALLON**, 2-speed, £29/10; also all new models; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9426]

**NEW 1917 Allon**, 2-stroke 2-speed models; £42 cash, easy terms 2% only.—Wanchope's, 9, Shoe Lane, London. [1905]

**ALLDAYS Allon**, 1917, 2 speeds, free engine, run 300 miles only, perfect condition; £35.—Percy and Co., 337, Euston Rd., London. [1980]

**ALLON (new)**, 2 1/2 h.p., 2-stroke, all models in stock for immediate delivery; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1852]

### Ariel.

**CROW Bros.**, Guildford.—Ariel, latest 3 1/2 h.p., 3-speed countershaft models in stock. [1048]

**ARIEL**, 5-6 h.p., 3-speed and clutch, O.B. sidcar, hood, screen, Lucas lamps, Cowey speedometer; £66; E.P. or exchange; all new models supplied.—Service Co., 292, High Holborn, W.C.1. [X9421]

**ARIEL (new)**, 2 1/2 h.p., 3-speed countershaft gear, clutch, and kick-starter, decompressor, patent spring seat pillar; £72; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1853]



## MOTOR CYCLES FOR SALE.

## Auto-Wheels.

**A**UTO-WHEELS.—Wall, complete, £7; another, De Luxe, £7/10.—Gittins, Ltd., Oswestry. [1784]

**A**UTO-WHEEL for sale, in good working order, run 2,500 miles; £10, or nearest offer.—Brackley, New Ground, Tring. [1844]

## Bat.

**6**h.p. Bat, 1915, single speed, special road racing model, includes accessories; £37/10 cash, or easy terms; guaranteed.—Wauchope's, 9, Shoe Lane, London. [1887]

**6**h.p. Bat, 1915, solo model, 2-speed gear, countershaft, condition as new; cash £45; including accessories; extended payments arranged; guarantee accompanies.—Wauchope's, 9, Shoe Lane, London. [1906]

## Bradbury.

**B**RADBURY 4h.p., 3-speed; £25; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9435]

**B**RADBURY, 3h.p., waterproof mag., new tyres, wide tank; 10 gns.; no postcards.—Brown, Rungmore Village, Burton-on-Trent. [X9381]

**3**h.p. Bradbury, all cane sidecar, engine just re-bushed, etc., good condition, powerful, 2 speeds and F.E.; owner joined army; £20.—Brunton, Hothfield, Broadstairs. [1778]

**R**IDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 T.T. Bradbury, 22 gns.; 1912 Bradbury, 2-speed, clutch, 21 gns.; 1914 Bradbury, countershaft gears, 29 gns.; sidecars to fit. (D) [1991]

## B.S.A.

**B**.S.A. 4½h.p. Combination, 1916, in real good order and condition; £55.—Percy and Co., 337, Euston Rd., London. [1978]

**19**15 B.S.A., 3-speed countershaft, all chain drive, run under 2,000, the property of an officer in France; what offers? Seen in London any time by appointment.—Box L5,190, c/o *The Motor Cycle*. [1967]

**19**16 B.S.A., 4½h.p., 3-speed, kick starter, clutch, new B.S.A. Canelet sidecar, complete with lamps, Klaxon horn, etc., perfect condition; £60.—Apply by letter, Lieut. Hemmingway, Hylton Castle, Sunderland. [X9253]

**4**½h.p. 1915 B.S.A. and Coachbuilt Sidecar, includes accessories, £55; also 1916 model and sidecar, £65; also solo B.S.A., 1915, £45; cash or extended payments arranged.—Wauchope's, 9, Shoe Lane, London. Guaranteed. [1888]

**B**.S.A. Combination, new January, 1917, countershaft 3-speed, new Dunlop tyres, 3 lamps, horn, B.S.A. coachbuilt sidecar, hood, adjustable wind screen, guaranteed in perfect order; £55.—The Premier Motor Co., Astor Rd., Birmingham. [1941]

**L**ATE 1914 B.S.A. Model H, new 3-speed B.S.A. gear box fitted, plate and enamel in 1916 condition, guaranteed mechanically perfect, Lucas lighting sets and horn, mirror, speedometer, and full kit of tools; any trial; 40 gns for quick cash sale.—Captain Hendey, Command Musketry School, Aldershot. [1877]

**R**IDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 B.S.A., chain-cum-belt, No. 1 sidecar, wind screen, 65 gns.; 1916 B.S.A., Phoenix sidecar, all-chain drive, 62 gns.; 1915 B.S.A., all-chain drive, coach sidecar, hood and screen, 49 gns.; 1913 B.S.A., 2-speed, clutch, 25 gns.; ditto, requires slight attention, 19 gns. (D) [1990]

**19**17 B.S.A., 4½h.p., with B.S.A. sidecar, well fitted with Lucas lamps (unused), Lucas horn and mirror, Dunlop tyres unpunctured, quantity of spares and tools, new in May, mileage 600, owner driven, no trouble or repairs done, unused for past two months, petrol 2 gallons; satisfactory reasons for selling; £80.—Lieut. Journal, R.A.M.C. Mess, Whittington Barracks, Lichfield, Staffs. [X9286]

## Calthorpe.

**C**ALTHORPE-J.A.P., 1915, 2½h.p., 2-speed; £22/10.—Redearn, 111, High Rd., Chiswick. [1843]

**C**ALTHORPE, 2½h.p., 2-speed, 2-stroke, 1915, overhauled, splendid gear; £21.—St. John's Manse, Whitchurch, Salop. [X9345]

**2**½h.p. New Calthorpe-Japs, 1917 models, Enfield 24 2-speed gear; £39/18; extended payments 2% only.—Wauchope's, 9, Shoe Lane, London. [1889]

## Clyno.

**C**LYNO, 1912, 5-6h.p., with sidecar; £20.—F., 78, Sistova Rd., Balham. [1807]

**C**LYNO Combination, 5-6h.p., 2-speed gear, new tyres, in perfect condition; £46.—Holden, West Wickham, Beckenham. [1932]

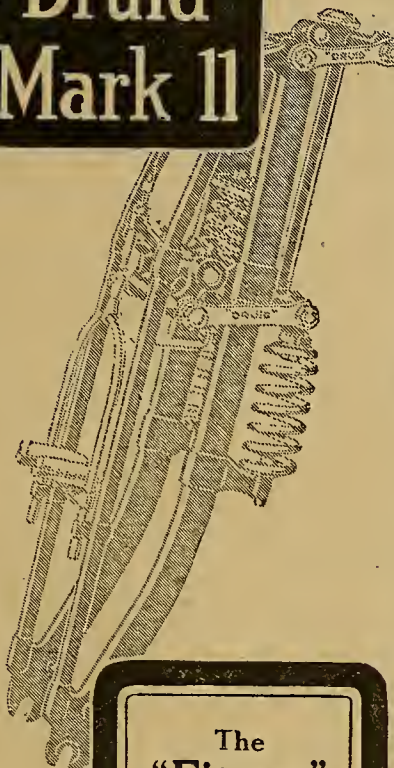
**6**h.p. Clyno Combination, 1917 War Model, fully equipped, in first-class condition.—Box 1,483, c/o *The Motor Cycle*. [X9358]

**R**IDER TROWARD and Co., 31 and 78, High St., Hampstead.—Clyno, 1912, 6h.p., 2-speed, coach sidecar; 24 gns. (D) [1998]

**C**LYNO 1913-1914 Combination, 5-6h.p., 3-speed, in perfect condition, like new; 45 gns.—Davies, Bowerham Dairy, Lancaster. [X9382]

**C**LYNO 1913-14 Combination, 5-6h.p., 3-speed, spare wheel, lamp set, Cowey speedometer, horn, etc., price £59/10; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9443]

# Druid Mark II



## The "Fittest" FORK

you must have  
to-day if by your  
rides you would  
always keep "fit."

Agreed?—then you  
must specify the  
DRUID MARK II,  
which alone is  
scientifically "fit"  
to quell all road shocks  
and thus promote  
your mount's  
efficiency and your  
consequent comfort.

Our three special  
DRUID models  
ideally cater

for all Solo and  
Sidecar machines

—therefore you need  
not hesitate a second  
before getting  
"the DRUID."

Folder free.

**A. DREW  
& Co., Ltd.**  
Leopold Street,  
BIRMINGHAM.

## MOTOR CYCLES FOR SALE.

## Clyno.

**19**16-17 Clyno, 5-6h.p., 3 speeds, chain drive, as new, cane sidecar; £65, or offer.—George, 32, High St., Wall Heath, near Dudley, Worcs. [X9311]

**C**LYNO Combination, 2-speed, 5-6h.p., spare 2-speed gear, 2 spare covers (one new), 6 spare tubes, large quantity of tools, spares, etc.; £45.—Whitlock, 28, Brook St., W. [1487]

**6**h.p. 1914 Clyno Combination, hood, screen, accessories, spare wheel, £65; also another, with family sidecar; cash or extended payments.—Wauchope's, 9, Shoe Lane, London. [1890]

## Coventry Eagle.

**C**OVERTRY Eagle, 1916, 2-speed, 2-stroke; 29 gns.—Rider Troward and Co., 31 and 78, High St., Hampstead. (D) [1994]

**C**OVERTRY Eagle, 2½h.p. Villiers 2-stroke engine, 2-speed countershaft gear, Brampton forks, Dunlop non-skid tyres; £42; offered on behalf of owner; absolutely unused.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1855]

## De Dion.

**D**E DION, 2½h.p., drop frame, Druids, Senspray, U.H. mag., footrests, and wide bars, stands back and front, in first-class order, with excellent tyres and tubes; rare sporty turnout; £15/10, or exchange with cash for 2-speed Douglas.—Simpson, Hatton, Aberdeen, shire. [X9352]

## Douglas.

**I**CAN Supply You with a 1917 Douglas.—J. Gourlay, Fallowfield, Manchester. [9358]

**19**13 2-speed Douglas, fair condition, lamps; £22.—40, Pendestone Rd., Walthamstow. [1963]

**D**OUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

**19**13 Douglas, kick starter, splendid condition; £25.—Parsons, 322, Broadway, Hendon, N.W. [X9337]

**F**OR Sale, 2½h.p. 1915 Douglas motor cycle, in first-class order.—Box 1,482, c/o *The Motor Cycle*. [X9337]

**D**OUGLAS, 1914, 2-speed, new tyres, in perfect condition; accept £35.—Elms, 179, Brixton Rd., S.W.9. [1588]

**D**OUGLAS, 1914, 2-speed, magnificent condition; 32 gns.—Julians, 84, Broad St., Reading. [10927]

**D**OUGLAS, 1914, 1915, many other machines, overhauled ready for use.—Griffins, 89, Gt. Portland St., W.1. [1806]

**D**OUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

**19**14 Douglas, 2-speed, lamps, horn, variable pulley, perfect condition; £32.—Wilkinson, Oakleigh Rd., Clayton, Bradford. [X9448]

**D**OUGLAS, 4h.p. (1915), 3-speed, kick start, with sidecar.—Apply, Powley, 98, Victoria Rd., Sutton Coldfield, Birmingham. [X9370]

**D**OUGLAS, 1913, T.T., 2 speeds, in exceptional nice order and condition throughout; £25.—Percy and Co., 337, Euston Rd., London. [1979]

**D**OUGLAS, late 1914, T.T., 2-speed, fine condition, all fittings; best offer on £30.—Cpl. Hearn, 94, Holland Rd., Brixton, London. [X9358]

**D**OUGLAS, 2½h.p., 1914, 2-speed, perfect condition, spare tyre and tube; £32.—Capt. Bowley, Lancing College, Shoreham-by-Sea, Sussex. [X9335]

**D**OUGLAS, 1914, 2½h.p., 2 speeds, splendid condition, electric light and few spares; £35, or near offer.—Morganti, 18, Wood Mews, Park Lane. [1878]

**D**OUGLAS, 1913, 2-speed, new pistons and rebushed, speedometer, lamps, and spares, splendid condition; £29/10.—Judge, Edgworth Rd., Sudbury, Suffolk. [1733]

**D**OUGLAS, 1913, 2-speed, Bosch mag., £35/10; 1911 2½h.p., with lamp and tools, £16/10; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9418]

**19**13 2½h.p. 2-speed Douglas, and accessories, splendid running order, new tyres, fuel for 500 miles; best offer over £26.—Brooke, 25, Newsome Rd., Huddersfield. [X9385]

**L**ITTLE Douglas, 2 speeds, 1913, but has not been used since commencement of the war, excellent condition; taking price £25.—E. Whomes and Sons, Bexley Heath. [1781]

**D**OUGLAS Motor Cycles.—We can deliver 1917 Model W or receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol. (Wholesale and retail.) [0923]

**L**ATE 1914 Douglas, 2-speed, clutch, and kick starter model, Lucas lamps and horn, done 3,000 miles only, new condition; any trial; £40, no offers.—107, Graystone Rd., Carlisle. [1768]

**19**15 2½h.p. Douglas, with light coachbuilt Watsonian sidecar, 3-speed, Bosch mag., full accessories, condition as new; 50 gns., or near offer.—Main, Grosvenor Hotel, Westcliffe, Essex. [2024]

**19**14 2½h.p. Douglas, 2-speed, tyre stand, lamp very good, mechanical horn, knee-grips, lamps, fast machine, excellent order; £33, close offer entertained.—Box L5,189, c/o *The Motor Cycle*. [1966]



## MOTOR CYCLES FOR SALE.

## Douglas.

**1916** Douglas, 2½ h.p., 3-speed, P.H. lighting set, mechanical horn, fully equipped, almost new; bargain, £45, or near.—W. Ayers, Lower Stables, Kensington Palace, W.8. Phone: Park 86. [1870]

**DOUGLAS**, 1912, 1919/10; 1913, £31/10; 1915, £45; prompt delivery of new 1917 models to doctors, farmers, etc., against Ministry of Munitions permit.—Motor Exchange, Horton St., Halifax. [1819]

**DOUGLAS**, 2½ h.p., late 1913, 2-speed, Bosch, Amac, footboards, new Dunlops and head lamps, good condition; owner joining up: £28/10, near offer.—Hyems, 47a, Picton St., Camberwell, S.E. [1772]

**DOUGLAS**, 2½ h.p., 1915 (Continental type), 3-speed model, as new, Bosch mag., lamps, generator, speedometer, tools, done very little work; price 42 gns.—Apply, 47, Breakspurs Rd., Brockley, London, S.E. [1802]

**SALE**, Douglas, 3½ h.p., 2-speed, free engine, clutch, and kick starter, Lucas lamps and generator, also rear lamp, horn, and all accessories; £50; inspection invited.—Benj. Watson, 5, Pleasant St., Edmondsey, Co. Durham. [X9343]

**1917** 2½ h.p. Douglas, Model W, hand-controlled clutch, kick start, latest improvements, £54, plus 20%; also Models U and V, 1916 specification, £50, plus 10%; absolutely new; immediate delivery against priority permits for doctors, farmers, war and munition workers.—How and where to apply for full particulars, write the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [1952]

## Edmund.

**EDMUNDS** (new), 2½ h.p. J.A.P., Royal Enfield 2-speed, spring frame, double tank, strongly built machine; £54/12/6; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Showrooms, 118, Brompton Rd., London, S.W.1. [1854]

## Enfield.

**ENFIELD**, 3 h.p., 1915, done 700, overhauled, Binks Stewart—9, St. John's Rd., Eastbourne. [X9407]

**PALMER'S** Garage, Tooting—3 h.p. Royal Enfield, 2 speeds, low, light, handy, economical; £30. [2018]

**ENFIELD** Combination, 1916, dynamo, mileage 700; £82.—31, Mapletorpe Rd., Thornton Heath, S.E. [1914]

**ENFIELD** 6 h.p. Combination; £40; exchange light weight, cash adjustment.—127, Stretford Rd., Manchester. [X9372]

**ENFIELD**, 3 h.p. twin, 1916 model, practically equal to new; 39 gns.—Julians, 84, Broad St., Reading. Phone: 1024. [0928]

**ENFIELD** 1915 3 h.p. Twin, 2-speed, done 2,000 miles; view City; £40, no offers.—Box L5,188, c/o The Motor Cycle. [1850]

**ENFIELD**, 1917, 2½ h.p., 2-speed, 2-stroke, run only 500 miles, and as new; £38.—Batchelor, Clarence St., Kingston-on-Thames. [1947]

**1912** Enfield, 2½ h.p., 2-speed, clutch, accessories, good condition; offers.—Townsend, 45, West St., St. George's Rd., London. [X9252]

**ENFIELD**, late 1915, 3 h.p. twin, and lightweight O.B. sidecar; £45; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9425]

**1916** Enfield Combination, as new, mileage 350, accessories, screen, lamps; cash down, £80.—Morrison, Begelly, Pembrokeshire. [1965]

**1917** 6 h.p. Enfield Combination and accessories, as good as new; £85; seen any time.—Bonnds Garage, 223, High Rd., Kilburn. [1829]

**ENFIELD**, 3 h.p., late 1915, 2-speed, kick start, Glorophone horn, lamps, tools; nearest £35.—43, Grove Rd., Sparkhill, Birmingham. [1912]

**1916** Enfield Combination, 6 h.p., Lucas lamps, mechanical horn, new spare Dunlop; £75.—Moffatt, 406, Garratt Lane, Earlsfield, S.W. [2013]

**ENFIELD** 6 h.p. Combination, late 1915, spares, mileage 3,500, splendid condition; £59; any trial. Co. 686, Garratt Lane, Tooting, S.W.17. [1935]

**3 h.p.** Enfield, T.T. bars, 30 gns.; also 6 h.p. combination, £55; guaranteed; cash or easy terms arranged.—Wauchope's, 9, Shoe Lane, London. [1892]

**1916** 6 h.p. Enfield Combination and accessories, in very good condition; £77; seen any time.—Bonds, Garage, 223, High Rd., Kilburn. [1830]

**ENFIELD**, 3 h.p., 1916 (first seen February, 1917), 2-speed, F.E., all chain drive, condition perfect; £42.—Riches, South View, London Rd., Peterborough. [X9329]

**6 h.p.** Enfield Combination, late 1916, F.R.S. lamps, Stewart siren, spares, condition indistinguishable from brand new; £70, lowest.—3, Trinity St., West Bromwich. [X9165]

**ENFIELD** Combination, 6 h.p., speedometer, Lucas lamp, Binks carburettor, practically new tyres, in good condition, mileage 14,000; only £35.—Schreiber, Lynton. [1909]

**ENFIELD** Combination, new August, 1916, full set of best accessories, and fuel for 600 miles, brand new condition; best offer over £75.—Brooke, 25, Newsome Rd., Huddersfield. [X9384]

**ROYAL** Enfield Combination, 1916, new condition, hood, wind screen, lamps, speedometer, luggage grid, engine No. 55,359; £72/10.—Ironmonger, 76, Lordship Lane, E. Dulwich, S.E. [1845]

## Maudes' Motor Mart,

## SIDECAR COMBINATIONS.

**ZENITH**, 4-5 h.p., 1917, Model C, lamps, horn, complete with sporting Phoenix Sidecar .. £65

**CLYNO**, 6 h.p., 1916, 3-speed, clutch, Lucas lamps, and special 6-point Sidecar, with windscreen ..... £80

**A.J.S.**, 6 h.p., 1914, 3-speed, clutch, lamps, horn, and Barberry Sidecar, with hood .. £65

**NORTON**, 3½ h.p., 1915, 3-speed, clutch, lamps, horn, and Canoelet Sidecar ..... £50

**DOUGLAS**, 4 h.p., 1915, 3-speed, clutch, lamps, horn, and Barberry Sidecar, with hood ..... £80

**A.J.S.**, 6 h.p., 1914, 3-speed, clutch, Miller lamps, and Canoelet Sidecar, with windscreen and hood ..... £60

**CLYNO**, 6 h.p., 1914, 3-speed, clutch, complete with Clyno 4-point Sidecar ..... £50

**EXCELSIOR**, 8-10 h.p., 1915, 3-speed, clutch, electric model, with sporting Sidecar .. £50

## SOLO MOTOR CYCLES.

**DOUGLAS**, 2½ h.p., 2-speed, Lucas lamps, horn **BAT-J.A.P.**, 5-6 h.p., 3-speed, clutch, Miller lamps, Klaxon horn, disc wheels, with light car tyres ..... £60

**SCOTT**, 3½ h.p., 1914, 2-speed, requires adjustment ..... £48

**CALTHORPE**, 2½ h.p., 2-stroke, 2-speed, 1915 **LUGTON**, 3½ h.p., single-speed, excellent solo mount ..... £20

**REX**, 4 h.p., 1913, 2-speed, Roe gear ..... £28

**RUDGE**, 3½ h.p., Multi model ..... £28

**RUDGE**, 3½ h.p., 1911, like new ..... £21

**ENFIELD**, 2½ h.p., twin, 2-speed, Lucas lamps **ENFIELD**, 2½ h.p., Grado gear ..... £11

**RUDGE-MULTI**, 3½ h.p., 1914 ..... £28

**ALLWAYS ALLON**, 1917, 2-stroke, brand new £42

**100, Great Portland St., LONDON, — W.1.**

'Phone: 552 Mayfair.

'Grams: "Abdicate, Wesdo."

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to stand daily usage. Any of the following Outfits converted to suit your requirements. "NO EXTRA."

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**MATCHLESS** (2) 8 h.p. Comb., £120 & £125

**NEW HUDSON**, V.I.B., 4 h.p., 3-sp., Sc. £84 18

**JAMES**, 1918, 5-6 h.p. twin Comb. £84 0

**ROVER**, 5-6 h.p. Comb., £124 5s.; solo £97 10

**ROVER**, 1917, 3½ h.p., 3-sp. Comb. £99 4/8

**ROVER**, 1916, 3½ h.p., solo, lamps, horn £58 10

**LEVIS**, Popular Model ..... £32 0

**CALTHORPE-J.A.P.**, 1917, 2½ h.p., 2-sp £39 10

**ALLWAYS ALLON**, from ..... £37 10

**ROYAL RUBY**, 2-str, £32; J.A.P., 2-sp £46 0

## SECOND-HAND MACHINES.

**ENFIELDS** (5), from ..... £58 10s. to £115

**H.-DAVIDSON** (3), from ..... £58 10s to £75

**GINGER**, 1913, 4½ h.p., 2-sp., horn, solo £29 10

**ARIEL**, 1915-16, 3½ h.p., c/sht., k-st. £72 10

**TORPEDO-PRECISION**, 2½ h.p., h-cl. £72 0

**JAMES**, 1916, No. 6 Comb., lamps, horn £73 0

**JAMES**, 1915, 4½ h.p., solo, accessories £22 10

**LEVIS** Popular, 1916, sound, accessories £25 10

**SPORTS DEPT.**—Footballs from 6/- to 25/-; Punch-balls from 8/- to 17/6; and Flashlamps from 1/11 to 25/- Inge stocks.

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## MOTOR CYCLES FOR SALE.

## Enfield.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Enfield 1917 6 h.p. combination, £82 gns.; 1916 ditto, 79 gns. 1917 3 h.p. twin, not sold, 47 gns.; 1916 2-stroke, 2-speed, 27 gns. (D) [2003]

**1917** Model 6 h.p. Enfield Combination, electric and acetylene lamps, speedometer, wind screen, luggage carrier, Palmer cord light car tyres, all in fine condition: £78.—Rector, Great Warley, Essex. [1869]

**ENFIELD** 6 h.p. 2-speed Combination, Miller lamp with generator, Watford speedometer, horn, luggage carrier, many spares, in splendid order; a bargain, £65.—Smith, White Wells Nurseries, Larkhall, Bath. [1917]

**ROYAL** Enfield 6 h.p. Coachbuilt Combination, perfect condition and appearance, small mileage, new gear, and re-enamelled, wind screen, luggage grid, just overhauled, a beautiful turnout; nearest £60 secures.—Roberts, c/o Skeats, Grosvenor Rd., Aldershot. [1767]

## Excelsior.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1916 British Excelsior, 8 h.p. J.A.P., coach sidecar, Lucas dynamo lighting; cost £110, 79 gns.; 1914 British Excelsior, 6 h.p., 2-speed, 34 gns. (D) [2002]

**AMERICAN** Excelsior Standard Model, 7 h.p., 3-speed, Bosch mag., special Montgomery sidecar, 3 lamps, horn, tools, etc., used for demonstration only, guaranteed equal to new in every respect: £75.—The Premier Motor Co., Aston Rd., Birmingham. [1943]

**AMERICAN** Excelsior New Model de Luxe, 7 h.p., 3-speed, dynamo electric lighting outfit, head lamp, tail lamps, and electric horn, luxurious coachbuilt sidecar enamelled to match, 28x3in. tyre, wind screen, etc.; complete, £105; liberal exchanges; delivery free to any address.—The Premier Motor Co., Aston Rd., Birmingham. [1942]

## F.N.

**2½ h.p.** F.N., good condition, accumulator ignition; £44/10.—G. Richards, Hendua, St. Denis. [1840]

**2 h.p.** F.N., Bosch, free engine, good tyres, nice machine; £6.—Nelson, 470, Wandsworth Rd., London, S.W. [1859]

## Grandex.

**GRANDEX-PRECISION**, 1915, 4½ h.p., 3 speeds, speedometer, P.H. lamp, 2ft. 10in. copper exhaust, tyres as new, splendid condition, 2 gallons petrol; any severe trial; £37.—Pattison, Sharnal St. Station, near Rochester. [X9357]

## Harley-Davidson.

**1917** Harley, 850 miles, solo only, beautiful condition; £80.—Church House, Canton, Cardiff. [X9124]

**HARLEY-DAVIDSON**, 1916, 7-9 h.p., electric model; £65; part exchange entertained.—5, Victoria Av., Surbiton. [X9354]

**1916** Harley-Davidson and Swan sidecar, mag. model, perfect condition, hardly used; £80.—37, Moter Gardens, Wall Hall, Eltham. [1777]

**HARLEY-DAVIDSON** 1916 Combination; exceptional bargain; any trial; £70; guaranteed.—Wauchope's, 9, Shoe Lane, London. [1893]

**1917** Harley-Davidson Combination, mag. model, lamps, horn, etc., as new; £150.—Elee and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551]

**HARLEY-DAVIDSON**, olive green finish, dynamo lighting, absolutely unscratched, and like new in every respect; £100.—Box L5,130, c/o The Motor Cycle. [1580]

**1915** Harley, C.B. sidecar, spare chains, valves, etc., tyres new, ride 100 miles to meet purchaser, £65; garage, 12ft. x 8ft., 28.—Spence, 10, Graham St., Irvine, Scotland. [X9351]

**1917** Model Harley-Davidson, splendid condition; £115; Swan sporting sidecar; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9441]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—Harley-Davidson, 1917, khaki model, Phoenix sidecar, sliding child's seat, dynamo lighting; 129 gns. (D) [2000]

**J. A. STACEY**, 12, Ecclesall Rd., Sheffield, has several H.D. combinations in stock, from 50 gns., all in perfect order; H.D.'s overhauled from 25/-; new parts extra; ask for quotation. [1687]

**1917** Harley-Davidson, mag. model, 3-speed, with very latest de luxe sidecar 17C, new September, fully equipped, many spares, under 2,000 miles; £130, or nearest.—Simpson, Hatton, Aberdeenshire. [X9353]

**HARLEY-DAVIDSON** Combination, 1915, electrically equipped, aluminium disc wheels, all sound, hood and screen, etc.; £75; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9440]

**1916** Harley-Davidson Model 167, 7-9 h.p., 3-speed, dynamo electric lighting outfit, special No. 3 Gloria spring wheel sidecar, luggage carrier, petrol can carrier, etc., not done 2,000 miles, guaranteed as new, the most luxurious combination possible; £85.—The Premier Motor Co., Aston Rd., Birmingham. [1944]

## Hazlewood.

**HAZLEWOOD** 5-6 h.p. Combination, J.A.P. engine, 3-speed, clutch, and K.S. lamps, speedometer, special sidecar; £65; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9420]



# THE MOTORCYCLE

ESTABLISHED IN 1903

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## The Coal Gas Question—Some Obstacles.

FROM the numerous queries that reach us, it is very evident that a great many riders have little conception as to certain difficulties which at present stand as the chief stumbling-blocks in the adaptation of coal gas as a fuel. The first difficulty lies, of course, in carrying the gas in a convenient form of container, and though we have already dealt pretty extensively with this side of the question, we venture to summarise the various aspects of the problem as follows:

The simplest and cheapest type of gas container is the ordinary gasbag or balloon, which can be inflated from a house installation, the suction of the engine drawing the necessary supply to the carburetter when running. With this system, which is adaptable to any machine without structural alteration, omitting the initial purchase of the gasbag, the cost of running may be taken as equivalent to running on petrol at 9d. per gallon. The drawbacks to the flexible bag, however, are its size, the wind resistance it offers, and its liability to become trapped or worn out at certain points by rubbing against its carrier when partially deflated. It is conceivable, then, that these balloons will not wear indefinitely, especially if exposed to high winds and changeable weather; but, notwithstanding such drawbacks, the system will probably prove much less costly and more convenient than the employment of bolsters inflated at very high pressure.

Certain expenses are inseparable from the bolster system, the first and foremost being the cost of charging up, which must be added straightaway to the price of fuel, for while the flexible bag can be recharged (in time) from the garage lamp bracket, the bolster demands a special pumping installation, without which it is useless. Unless the pressure system be universally adopted—in which case the bolsters could be recharged in a few seconds from large, high

pressure reservoirs—the process of recharging would be slow and costly; in fact, it may be taken that one's 300 cu. ft. of gas would then cost something in the neighbourhood of 1s. 6d. instead of 9d. Similarly, the cost of the container in the first place would be very much higher than that of a flexible balloon, a reducing valve would be necessary, and other minor structural additions would have to be tackled, so that it may be taken that until the pressure bolster system becomes universally adopted and every facility made for recharging the bolsters on wholesale lines, the flexible balloon system is the only one likely to come within reach of the everyday motor cyclist.

## Spontaneous Ignition.

WE print this week on another page an article that offers an explanation of konking which is probably new to many motor cyclists, but not to all; for this is not the first time that we have drawn attention to the matter. As long ago as April 29th, 1915, we stated that motor cycle engines were prone to konk when paraffin took the place of the usual fuel, because the ignition point of paraffin was far lower than that of petrol, while benzole, having a high ignition temperature, practically never caused konking. In support of this statement, we gave figures supplied by Professor W. Morgan, of Bristol, showing the usual ignition temperatures of paraffin, petrol, and benzole of certain specific gravities. The figures differ slightly from those in the more comprehensive table set out by our contributor, but this may well be accounted for by the difference between the quality of the pre-war and present day fuels. We are glad to have our view corroborated by so great an authority on fuels and oils as Mr. Moore, and we are particularly interested in his suggestion that a racing engine employing a very high compression and a suitable fuel would play havoc with the present day records.

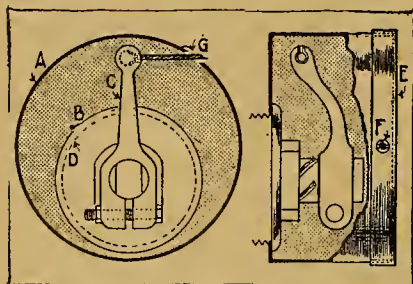


# IDEAS: Useful and Ingenious.



## COVER FOR CLUTCH OPERATING WORM.

THE idea given below was sent by Cpl. R. E. Chapman, who says: "We have been using these covers on our machines in Palestine for a long time, and find them very efficient against wear caused by sand mixed with the grease which exudes from the clutch



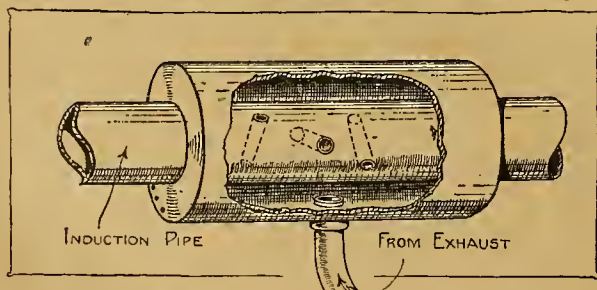
Cover for worm of Sturmey-Archer gear.

- A. 2 oz. tobacco tin
- B. Clutch nut
- C. Clutch lever
- D. Dotted line, hole cut in bottom of tobacco tin, just large enough for clutch nut thread to pass through
- E. Tobacco tin lid (tin with riveted head)
- F. Spoke cut short passing through both sides (clutch nut thread to pass through also)
- G. Hole in tin for cable to pass through

worm. The cover is very simple to make, all that is necessary being a long tobacco tin and a spoke F to keep the lid E in position. The other details are explained by the sketch."

## FITTING A HOT AIR INTAKE.

MANY carburettors lend themselves very badly to the fitting of hot air inlets. In such cases an exhaust heated inlet pipe will be found very efficient when using heavy fuels. A copper jacket is brazed round the inlet pipe, having a union on one side to take a pipe from the exhaust pipe, and on the other side an outlet pipe for the exhaust gases. Now, since the time taken by the gas to pass through the inlet pipe is infinitesimal, there is a great danger in using heavy fuels of only that part of the gas becoming heated which comes in immediate contact

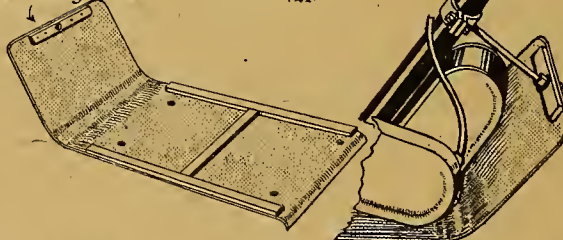
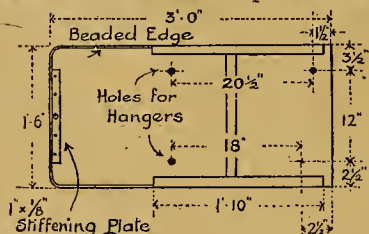


An inlet pipe heated from the exhaust.

with the walls of the inlet pipe, and the centre volume of gas passing through in a wet state. To minimise this danger three small copper tubes are brazed through the inlet pipe. These, as will be seen from the illustration, are set diametrically staggered, and serve not only completely to warm the gases, but also to break up the charge—a desirable feature when using heavier fuels.—GERALD COATH.

## AN UNDERSCREEN.

THE screen protects the underside of the engine, footboards, contact breaker, and the driver's feet and legs from mud splashes. A piece of 24 gauge sheet iron forms the main part of the screen. A light wood frame is then screwed to the iron to prevent rattle or



A simple method of making an underscreen to protect both magneto and engine.

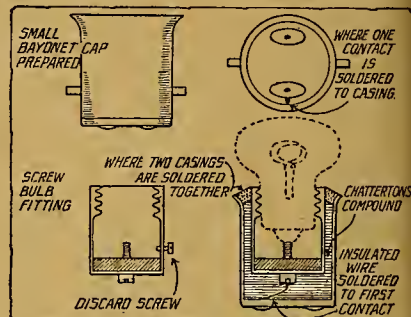
vibration, and the holes drilled through screen for the hangers.

The edge of sheet iron should then be beaded over (having a thin wire inserted) to take away the sharp edge of the iron, and then the end can be bent to the required angle.

It should be given two coats of black enamel before being fixed. The footboards should be removed, and the footrest tube clips moved nearer to the engine to receive the hangers of screen, and when the footboard bolts are screwed up the screen will be rigid.—H. SLATER, Doncaster.

## AN ELECTRIC LIGHTING TIP.

A USEFUL adapter which enables motorists to fix an ordinary small amperage screw bulb directly into an electric lamp with the usual small



Explanatory sketches showing method of fixing a small amperage screw bulb to an electric lamp.

bayonet fitting can be made as described below. First, secure a worn-out small bayonet capped lamp, break off and out from the brass all the glass and also the plaster of Paris, taking care not to injure the black insulating material which secures the two contacts. Then attach a small gauge insulated wire to the bottom screw of an ordinary screw bulb fitting, and pass through one of the contacts, which will be found to be already drilled, and solder the wire to the same contact, filing off flush. The central contact screw must be nicely adjusted. The second and smaller screw is discarded. Solder the second contact to the brass casing. Fill up the space between the screw bulb fitting and bayonet cap with warm Chattertons compound, and finally solder the two fittings together on the top. The fitting in connection with a Helsen dry cell is very efficient.—JOHN LOWE, Derby.

## A WET WEATHER TIP.

NOW that the rainy season is with us, many riders, particularly owners of direct belt-driven machines, will be feeling the need for an undershield to keep the slush from being thrown up on to the pulley, magneto, and the underside of the engine. I have found that a very good undershield can be made from a strip of oilcloth, which may usually be found about the house. It can be easily cut into the desired shape and attached to the frame by means of insulation tape.—A. HILL, Middlesbrough.





### Stiff Crankshafts.

A DESIGNER recently imparted to a member of our staff some interesting details of his efforts to secure a coveted record. He built an engine for the purpose, and was extremely mortified when its trial lap registered no more than a cautious 36 m.p.h. Various modifications procured no improvement, and he was at his wit's end, when the crankshaft kindly broke. This set him thinking, and after a new and stiffer shaft was installed the machine lapped at 58 m.p.h. Encouraged by this amazing advance, a still heavier crankshaft was made and mounted, and the engine responded by doing 70 m.p.h.

### Stopping the Blowback.

PATENT rights are being sought for a carburetter which claims to reduce petrol consumption very perceptibly. A certain amount of our fuel is wasted by "flooding." Spirit brims over the jet, sometimes through the momentary presence of dirt on the needle valve seating, sometimes through vibration jerking the needle off its seat, sometimes through sudden deceleration of the engine, when the column of petrol in the feed system fails to slow down sufficiently quickly in response. Such petrol is wasted through the bottom air holes of the average motor cycle carburetter. Furthermore, when the inlet valve shuts the column of gas rushing up the inlet pipe is suddenly checked, and in its rebound petrol vapour is expelled through the top air orifices, or, if the petrol is imperfectly vaporised, wet petrol spray is often ejected. These sources of wastage are supposed to be cut out in the new design. The foot of the spraying chamber is sealed—the usual "bottom air" holes are transferred to a point about midway up the sides of the spraying chamber. Flooding petrol must be trapped in the sealed well below the jet, and it is thought that "blow back" is also prevented from reaching either set of air holes and will be reinhaled towards the engine on the next induction stroke.

### Aluminium Cylinders.

A LITTLE bird—possibly a peace dove—tells me that the first aluminium motor cycle cylinders are already on the road. I hope they are coming commercially, but with the prettiest of all metals at £225 a ton, or thereabouts, it's a long, long way to Tipperary. The experiment is a huge success. The engine keeps unbelievably cool. I do not fancy that appearance counts for much, or some American machines would have been turned back at Liverpool by outraged Customs officers; but for those who like appearance, let me say that neither rusty cast iron nor neatly radiolened cast iron can compare with machined aluminium in perfect beauty. The weight reduction is obvious, though not vital, and the previous power curves have all been torn up, as the new one is a straight line with a gradient that almost falls back

on itself. Joking apart, if we ever get cheap aluminium, aluminium motor cycle cylinders will be standard; and if we never get cheap aluminium, we shall all be able to recognise the shamateur in competitions because he will be the only amateur who is not restricted to cast iron. Anybody care to bet on the next T.T. seeing aluminium cylinders first, second, and third? [Are not the columns of a newspaper a "place within the meaning of the Act"?—Ed.] [Stop press. My æsthetic susceptibilities have just received an awful blow. The inventor 'phones that he is now getting improved radiation by doping his aluminium fins to another colour (details suppressed by Censor, as it is an aero dodge). I hope he will freeze his lubricating oil, and be forced to return to the metal's natural sheen.]

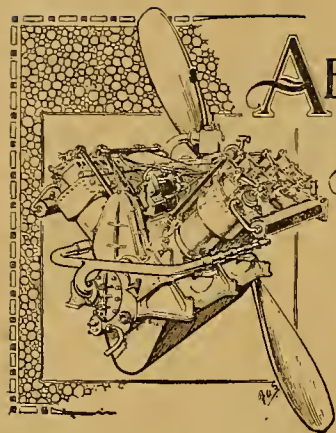
### The Leviathan Flat Twin.

SOME time ago I was drawn into a general controversy on the possibilities of the flat twin, and one of the combatants largely founded his case on a theory that the flat twin was only efficient in small sizes—that the wee Douglas might be capable of wonders, but that the 500 c.c. flat twin would never be much good, and that as for manufacturing the type in larger sizes it simply could not be done. It is therefore rather interesting to know that a very big flat twin engine—far too big to be housed in any rational motor cycle—has just about beaten all previous records for technical efficiency in petrol engines, alike as regards power output and durability. I may be wrong in my general contention, as my critic was in his; but let us note in passing that it is at any rate possible to make a leviathan flat twin which can compare favourably with all its rivals in the technical standards.

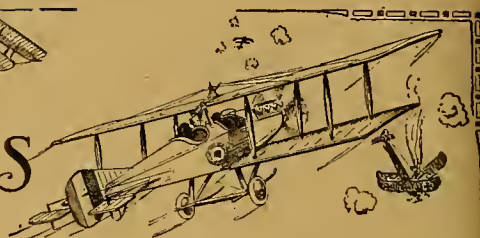
### Watching the Exhaust Valve.

WILL some expert tell us under what conditions heated metal can ignite the ordinary explosive charge of a petrol engine? Recently I was watching the test of a petrol engine which was not fitted with exhaust pipes or silencers. The exhaust valve guides were visible through the naked exhaust ports, and within a very few seconds after starting up the guides were red hot. The engine fired perfectly, and the guides cooled down to blackness again within twenty seconds of switching off. The valve heads were naturally invisible; but I could not help wondering whether the exhaust valve heads, and particularly the edges of the screwdriver slots in their faces, may not sometimes be responsible for pre-ignitions for which the sparking plug takes the blame. On the other hand, I once owned a 4½ h.p. Riley tricar, the exhaust pipe of which used to glow a rich cherry red at night for about six inches below its cylinder union nut, and yet the dogged old engine would keep on pulling merrily.





# ABOUT AERO ENGINES



## No. II.—THE ROTARY TYPE.

Many of our readers are probably ignorant of the special features that distinguish aero engines from motor cycle and motor car engines. Samples of the leading types of aero engine will be briefly described in this series of articles, the second instalment of which we print below.

THE purpose of this instalment is to make clear to novices, accustomed only to motor cycle engines, how a rotary engine works; but, by way of preface, attention may be drawn to its special merits as an aero engine, about which there has been a profound difference of opinion between the Huns and ourselves. At the outbreak of war the Hun knew as much about rotaries as we did. He was as free to buy Gnômes as we were, and in the *Ubersusel*—a German edition of the Gnôme—he possessed his own home-made rotary. On these facts he and we came to opposed conclusions. He scrapped the rotary, and we went ahead with it, despite many trade and press criticisms, and even despite protests from leading members of our own flying services. Time has proved the Hun wrong, and there are rumours that in the fourth year of the war he may revise his conclusion, and frenziedly try to regain lost ground in this department. The first merit of the rotary is its extremely light weight, which at present offers us a better power to weight ratio than any other type. Its lightness is achieved by its air-cooling, which dispenses with water jackets and heavy tanks, and by its stumpy single-throw crankshaft and its diminutive crank case. Its second merit is its compact dimensions, which, as stated in the opening article, give its aeroplane some such superiority in manoeuvre as a T.T. motor bicycle

forty or fifty hours flying rapidity in the job is a valuable factor.

### Heavy Consumption.

The persistent demerit of the rotary is its comparatively heavy fuel and oil consumption. This incapacitates it for use on aeroplanes built for long distance work, seeing that the weight of the enormous tanks that it would need on such jobs utterly spoil its power to weight ratio. In other words, a rotary engine's "dry" weight per horse-power is magnificent, as compared with that of a vertical engine of the same horse-power; but if you weigh the two engines with tanks adequate for a six-hour flight the boot is generally on the other leg. Consequently, rotaries are earmarked for small scouting and fighting planes, which do not remain up for long at a time.

To understand how a rotary engine works, the novice must study fig. 1, which shows the crankshaft. It is immovably fixed in the front bearer plate A by a suitable joint—probably a key and taper. It is further steadied by a second fastening in the rear bearer plate B. The revolving crank case is built in three pieces, as shown in fig. 2. These three parts are bolted together. D is the cam case and F is the box containing the thrust bearings which take the push of the propeller. D rides on the two front crankshaft ball bearings, marked J<sub>1</sub> and J<sub>2</sub> in fig. 1. F rides on the two rear crankshaft ball bearings, marked J<sub>3</sub> and J<sub>4</sub> in fig. 1. The centre section of the crank case, is not directly supported on the crankshaft, but it is bolted to D and F, and rotates with them on their bearings J<sub>1</sub>, J<sub>2</sub>, J<sub>3</sub>, and J<sub>4</sub>. The centre section E has seven holes in its periphery, to which the seven air-cooled cylinders are bolted. The propeller hub is bolted to the front of D and revolves with it.

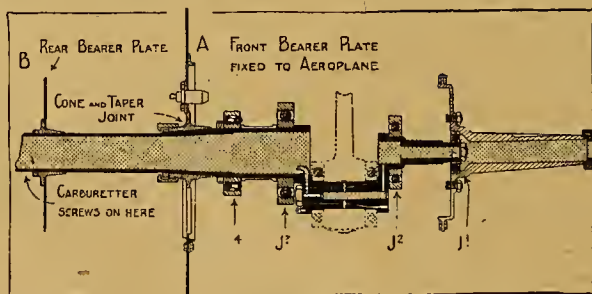


Fig. 1.—The stationary crankshaft of a rotary engine.

can claim over a 12ft. six-cylinder car in twisty lanes. Its third merit is the rapidity with which it can be overhauled between flights. It is probably a several days' job to overhaul a 260 h.p. Mercédès vertical six-cylinder. If the German squadrons can overhaul that engine in less time, they either require very large staffs or else a normal staff must work very much harder than the staff of a rotary squadron; for a rotary engine can figure in the closing patrol of one day's flying and take the air with the first flight on the opening patrol of the next day, having undergone a complete dismantling in the interim. You can whip all its pistons out in a little over a quarter of an hour. As aero engines undergo routine overhauls after every

ders are bolted. The propeller hub is bolted to the front of D and revolves with it.

### How the Engine Rotates.

Next let us see how the crank case is made to rotate on its ball bearings. Fig. 3 shows a frontal diagram of the engine. The connecting rods ride on two ball



**About Aero Engines.—**

bearings mounted on the single throw of the crankshaft (incidentally, the crankshaft has to be built up out of at least two pieces, to get the crank pin bearings on at all). So that the centre of the circle on which the pistons revolve is approximately the axis of the crank pin, which we will call M, whereas the crank case, riding on the crankshaft ball bearings, swings round the crankshaft axis N. The cylinder FC has just fired. In what direction can the force of the explosion, shown by the arrow, act? Can it drive the piston downwards? No, because the piston is connected by a rigid rod to a fixed point. Can it blow the cylinder off outwards? No, because the cylinder is bolted to the crank case. How, then, does the force of the explosion spend itself; how do the expanding gases make a larger space in which to swell themselves?

It is clear from fig. 3 that the pistons swing round the point M, the crank pin axis; and the cylinders swing round the point N, the crankshaft axis. Now M is higher up in the engine than N. The cylinder FC, when it fires, is at or near the top of the engine, and its piston is high in the cylinder; as that cylinder swings round towards the foot of the engine, its piston will be low in the cylinder, because M is higher than N, and the further the cylinder swings round away from M, the greater the space above its piston.

Thus the surging pressure of the gases is not to be denied of expansion; and the engine is already being swung by the mechanic who is turning the propeller so as to move the cylinder FC down towards the foot of the engine. The gas assists in this rotary motion. Their pressure acts in two directions, rather like that of a wedge with which a woodcutter splits a log, parting the splits asunder, and deepening the split simultaneously. The first effect of the explosion is to press the piston head and cylinder head apart; they refuse to be pressed apart along the line of the cylinder axis, but they are ready to yield if the cylinder axis is swung round towards the horizontal. Something must give; the crank case is quite willing to swing round and lower the axis line of the cylinder, and so the engine begins to spin. The pressure is actually felt equally on the top of the piston and the interior of the cylinder. As the cylinder rotates, being bolted to the crank case, it takes the crank case with it, and the three-piece crank case, carrying the propeller hub, begins to spin round on the immovably mounted crankshaft. As the force of the first explosion is expended, another cylinder rises up to the firing point, and the crank case, receiving another rotary impulse of the same origin as the last, spins with increasing speed.

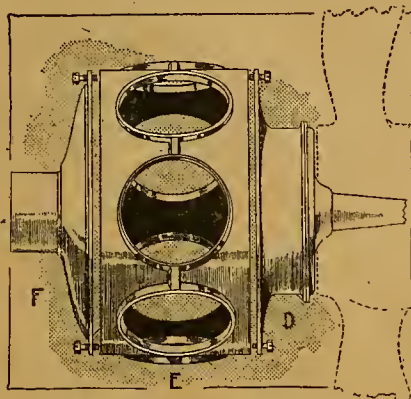


Fig. 2.—The revolving crank case.

Carburation presents a difficulty, and has met with various solutions. The crankshaft being hollow, the usual plan is to screw the carburettor to its rear end, behind the back bearer plate. The mixture is then sucked along the hollow crankshaft and enters the crank case. On the original Gnome engine automatic inlet valves were set in the piston heads, and the gas passed through them from the crank case into the combustion heads. In more modern engines inlet pipes couple overhead inlet valves set in the combustion heads to ports in the thrust box casing. Overhead exhaust valves, carried in the combustion heads, are invariably used and exhaust direct into the air.

Ignition is quite simple. The back of the thrust-box is running at engine speed. We mount in it an insulated contact segment for each cylinder. The front bearer plate is stationary, and we can set it close up against the back of the thrust box and set a high tension carbon brush in it. To this brush we lead current from an ordinary single-cylinder magneto of motor cycle type, and the spinning thrust-box makes an excellent distributor.

**Lubrication.**

Lubrication, too, is simplicity itself; since we have only to introduce oil into the rotating crank case, when centrifugal force will immediately fling it all over the inside of the engine, from the centre outwards—in fact, it is here that our heavy oil consumption will occur, as we cannot use the oil twice, or circulate it, as we do in car engines. Let it once get flung up into the pistons and cylinders and centrifugal force will keep it there. So we fasten an oil pump somewhere towards the rear of the crankshaft; the pump sucks oil from our main tank and forces it along a pipe which lies inside the hollow crankshaft. Carefully arranged feeds must conduct it into the connecting rod bearings, and the four big ball bearings, or centrifugal force will see that they get none at all; so

each of these parts must have its own private oil duct. The rest is easy. A little loose oil is allowed to escape into the centre of the engine, and the swing of the engine buzzes it heartily into every outer corner, whence it will never return, but will blow out of the exhaust valve and scent the air.

Two interesting details are omitted for prudential reasons. It is not wise to say anything about the cam gears and the design of the

seven connecting rod big ends, all of which ride on the single crank pin. But any reader who wishes to study them can obtain books giving particulars of the original Gnome design, which will give him fuller information on the subject of which so much is, to an ordinary journalist, "taboo by order of the censor."

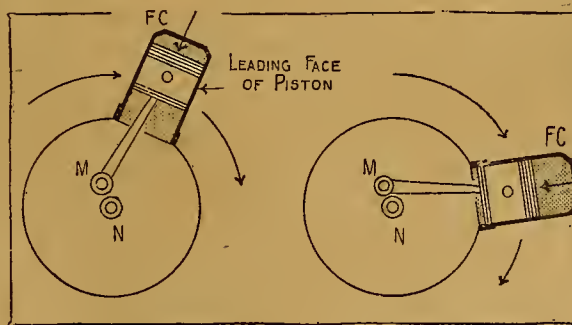
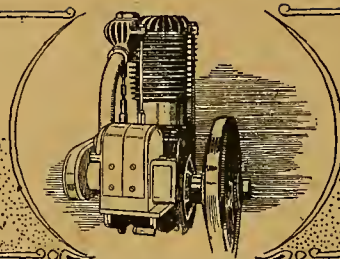


Fig. 3.—Diagram to show the effect of the explosion.



## Spontaneous Ignition.



## Its Influence on Temperatures of the Working of Petrol Engines.

The following article offers an explanation of the causes of knocking that we think will be new to a great many motor cyclists. The author of the papers referred to is particularly competent to speak authoritatively on this subject, as he has spent more time in researches connected with it and with the working behaviour of liquid fuels than has, perhaps, any other living investigator.

SOME interesting reflections on the working of the petrol motor are suggested by two recently published papers on the ignition temperatures of fuels\*, and may be of interest and use to motor cyclists as pointing out the direction in which increased power and greater economy may be attained.

Both experts and amateurs have experimented with variations of cam contours, valve timings, carburetter adjustments, and the numerous other adjustments generally referred to as "tune." Regulations of compression are also carefully made when engines are required for racing purposes, but the fundamental rules which limit the raising of compression are rarely fully understood. The use of special fuel for racing has been common, particularly in the early days of motor cycling; but these mixtures, containing picric acid, naphthalene, ammonium perchlorate, and a great variety of other substances, were prepared with a view to creating a greater impulse or more rapid detonation of the explosive mixture in the cylinder. Few experiments have been made on fuel mixtures with a view to obtaining increased power and efficiency by the employment of high compression pressures. It is a well-known fact that both the thermal efficiency and the power obtainable from a petrol engine are dependent upon the compression.

### Thermal Efficiency and Compression Ratio.

The thermal efficiency of an engine is the proportion of heat latent in the fuel which is converted into work, and this for the average motor cycle power unit working at full load is some 20%—that is to say, four-fifths of the total heat employed is wasted in converting the remaining fifth into work. It is therefore evident that there is much room for improvement in economy. Internal combustion engines, whether two-stroke or four-stroke, may be divided into two classes—those operating on the constant volume cycle and those employing the constant pressure or Diesel cycle. All the petrol motors at present in use operate on the constant volume cycle, in which the fuel charge is caused to explode after being compressed, the force of this explosion being utilised to drive the engine. In both the constant volume and the constant pressure cycles the theoretical efficiency obtainable is dependent upon the compression ratio; the higher the compression ratio the higher is the efficiency. It is also found to be the case in practice that high compressions are

accompanied by high efficiencies, and, conversely, low fuel consumption. Raised compressions are also accompanied by an increase in power. From the foregoing statements it would appear that the one thing needful to promote economical working and increased power is to increase the compression ratio, and this statement is perfectly correct, but on increasing the compression we are confronted by a serious difficulty. Increase of compression is liable to cause pre-ignition.

When a gas is compressed its temperature rises according to the formula:

$$t_2 = t_1 \left( \frac{P_2}{P_1} \right)^{\frac{n-1}{n}}$$

where  $t_1$  is the initial temperature absolute,  $P_1$  and  $P_2$  the initial and final pressures absolute respectively, and  $t_2$  the resultant temperature absolute;  $n$  is the ratio between specific heat at constant volume and specific heat at constant pressure, and for air is 1.408. In internal combustion engines it more closely approximates to 1.35. By means of this formula it is possible to calculate the temperature of the gas present in the cylinder before the ignition of the charge.

Now when the compression of an engine is raised beyond certain limits the temperature of compression becomes so high that the mixture ignites spontaneously. It will be clearly seen that if this spontaneous ignition takes place before the firing by the spark it will act on the piston before dead centre and exert a retarding moment on the crankshaft. This action is well known to the majority of motor cyclists, and is known as pre-ignition, and is accompanied by knocking and falling off in power.

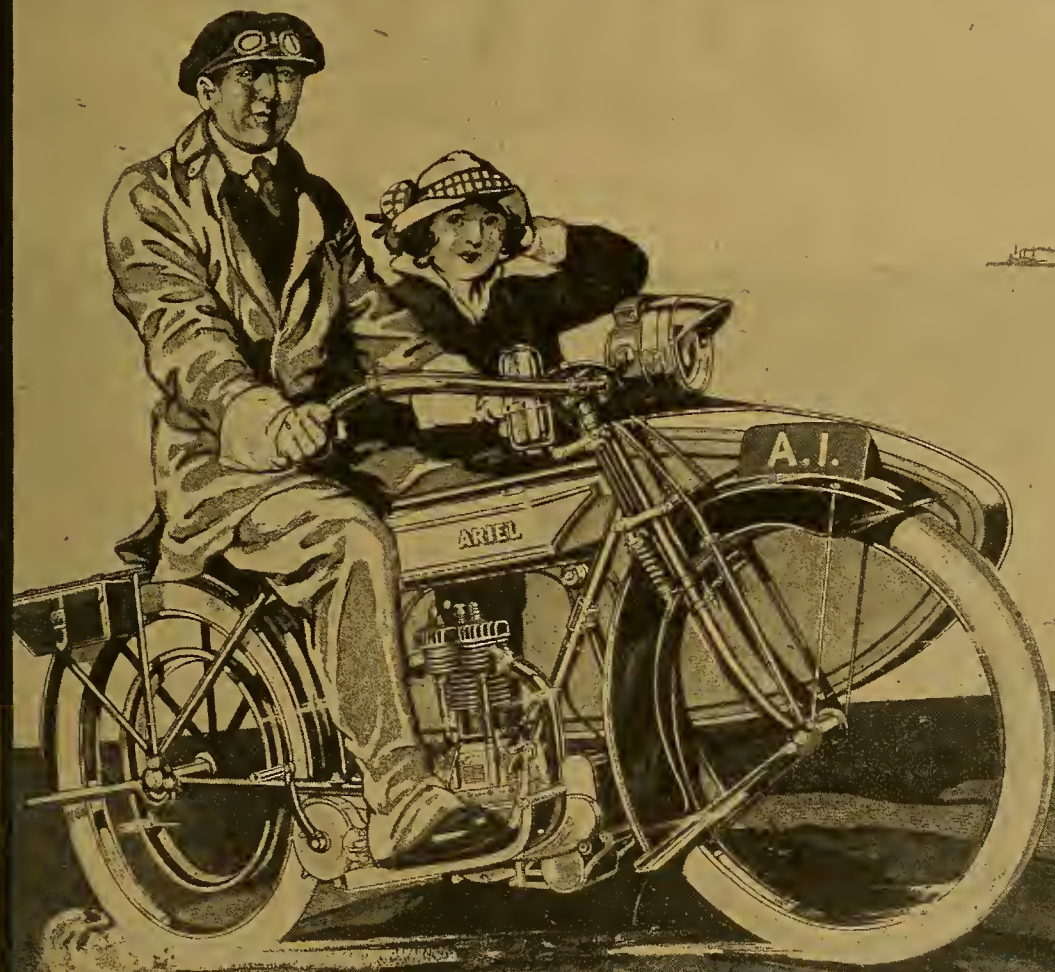
### Spontaneous Ignition Temperatures.

Heated portions of the walls of the combustion space are liable to cause pre-ignition. In a well-designed engine in good condition such local heating is avoided, but there still remains the limit of maximum compression caused by the necessity of avoiding spontaneous ignition. In the papers previously referred to Mr. Moore has published the results of investigations of spontaneous ignition temperatures. Without entering into details, we may state that an instrument for ascertaining the spontaneous ignition points of liquid fuels is described in these papers, and a table showing the ignition points of several fuels is given. A few of these figures, which may be of interest to motor cyclists and others, are reproduced in the table on the following page. The figures have been obtained by Mr. Moore in experiments that have been described in the papers to which reference is made.

\* H. Moore, "Spontaneous Ignition Temperatures of Liquid Fuels for Internal Combustion Engines," *J. Soc. Chem. Ind.*, February 15th, 1917, page 109. Also "Spontaneous Ignition Temperatures of Liquid Fuels," *The Engineer*, January 22nd, 1917, page 561.



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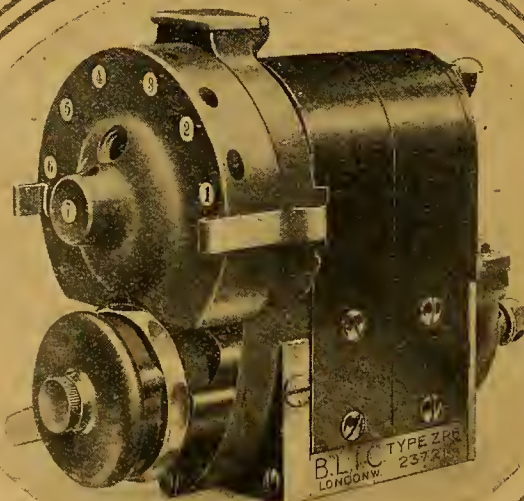
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## Spontaneous Ignition.—

## TEMPERATURES OF SPONTANEOUS IGNITION.

Description of fuel.	Specific temperature gravity. in oxygen.		Spontaneous ignition ° C.	
Pratt's Perfection spirit No. 1	...	.710	...	272
Petrol (Mex)	...	.718	...	279
Pratt's spirit No. 2	...	.724	...	270
Taxibus spirit	...	.729	...	272
Paraffin oil from Anglo-American Co.	...	.807	...	251
Empire paraffin	...	.782	...	253
Gas oil from Anglo-American Co.	...	—	...	254
Oil engine oil (shale oil)	...	.768	...	253
Lighthouse oil (shale oil)	...	.803	...	251
Commercial xylol	...	.860	...	484
Toluol, 90%	...	.863	...	516
Benzol, 100%	...	.875	...	566
Alcohol (ethyl)	...	.817	...	395
Turpentine	...	.842	...	275
Compressor lubricating oil	...	.875	...	265.5
Engine lubricating oil	...	.894	...	265.5
Ether	...	.730	...	190
Naphthalene	...	—	...	402

The importance of the temperature of ignition is markedly shown in the case of alcohol. It will be observed that petrol spontaneously ignites at a temperature of about 275° C., whereas alcohol requires a temperature of 395° C.

**Alcohol and Compression Ratio.**

The ordinary motor cycle engine employs a compression of about 90 lb. per square inch, and an aero engine about 120 lb. per square inch, the respective

thermal efficiencies being approximately 20% and 26%. Now, with alcohol, on account of its high ignition temperature, it is possible to employ a compression pressure of 200 lb. per square inch, which gives a thermal efficiency of 36% and a much greater power per unit of cylinder volume than is possible with petrol. It will be noticed that paraffin oil (kerosene) has a low ignition point, which accounts for the "knocking" frequently experienced when running on this product.

Makers of substitutes seem to have largely if not entirely overlooked this problem of the ignition point, otherwise they might have so blended their mixtures as to have prevented the low ignition point and consequent tendency to pre-ignite which is experienced when driving on the majority of present-day substitutes. The tar products possess high ignition points, and it is noticeable that when driving on substitutes which mainly consist of tar products pre-ignition and overheating are almost unknown. Would it not be a much more logical procedure to mix such bodies with the petroleum and shale products which are so low in ignition point?

It appears highly probable that by employing a product of high ignition point, say, benzole for racing purposes, with a high compression (at least 200 lb. per square inch), we could pull down some of the present-day speed records.

The importance of some of these considerations cannot be over-estimated, and those who first appreciate them will reap the benefit.

P.J.M.

## AUTUMN IN WESTMORLAND.



A picturesque scene near the southern entrance to Lake Windermere at Newby Bridge. Hundreds of motor cyclists will recognise the spot, which may recall to many the happy touring days of old. The sidecar is a 5-6 h.p. A.J.S.



## IDEAL MACHINES.

An Appeal Against  
some Modern Tendencies.

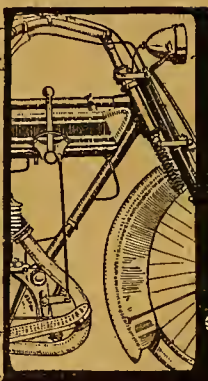
**M**ANY writers have been expressing their views on the above subject, but there seems little unanimity of opinion. I should like to jot down a few remarks on a point of view that I have not seen taken, namely, that if manufacturers are to be moved they must be shown that "there is money in it."

The manufacturer looks always to the "almighty dollar." No one can blame him. He would be a fool or worse if he did otherwise. He is a materialist: he is never an idealist (except incidentally, and then often as a failure!) He wants to make all he can. This depends primarily on the number of machines sold and the price, so he looks to the biggest markets. Hence, the sidecar boom; hence, the two-stroke boom. But the problem is not so entirely simple as this. There may be ten times as many machines sold of a certain type as of another and less popular type; but, for that very reason, there is keener competition. A maker, therefore, who enters a popular field is up against this competition. His *clientèle* hangs upon a slender thread: a small improvement by a rival maker may rapidly deprive him of a large percentage of it.

### A Distinctive Type.

If a maker can produce a machine of a *distinctive* type he may have as big a following as he can cope with, and it will be *stable*. Better, therefore, that he should build some distinctive type—better, but not so easy. Hence, the habit of "follow the leader" which has been persisted in by so many makers. But firms who bring out a new type and break fresh ground nearly always reap their reward. The Triumph has done it. Douglas has done it; likewise Rolls-Royce and Ford. Perhaps someone will say that fresh ground cannot be broken to-day—that it has all been so thoroughly ploughed up already. But has it? Is there no gap? Is everyone catered for?

The heavy sidecar *de luxe*, the powerful "solo" mount, the light solo mount, and the yet smaller two-stroke—all these types are well represented, and thus the "family man," the ordinary tourist, the business man, the "potterer," and the "speed man" are all well provided for. I say advisedly the *ordinary* tourist. The man who is not provided for, in my opinion, is the enthusiastic motorist and tourist, *i.e.*, enthusiastic both on motoring *quâ* motoring and on touring and travel. *He wants a machine which is a continual pleasure to drive*, and I venture to assert that nothing he can buy comes up to what his experience teaches him to expect. The heavy twin is too cumbrous, the single is too crude and noisy, the



smaller twins are not sufficiently flexible and controllable, the lightweight lacks both power and comfort.

These may seem sweeping assertions, but I have been riding since 1901, and have owned nearly every type of machine, and I find that nearly every one I meet who has ridden for upwards of ten years, and who is fond of *solo* touring, agrees with this view.

### Flexibility a *sine qua non*.

We want silence, flexibility, and power—not extreme speed, but *pulling power*—and last, but not least, comfort. We do not want a multiplicity of gears. We care nothing for an engine "that can rev." We want a *steady* engine—an engine that will respond to the throttle, that is *exactly obedient*, and *has no ideas of its own as to what speed it is best to run at*. We should like to think it was related to that grand old man, the  $2\frac{3}{4}$  h.p. De Dion, and we know from the machines we see that such an engine can be built. The big American twins have all the silence we require: we have seen the flexibility of the Blackburne with its outside flywheel. There is no reason why a motor cycle engine should not be as silent as that of a car. There is no need to carry heavy three-speed transmission: one gear and an emergency gear are all that are necessary. There is no reason why spring frames should be heavy: helical springs are light: the new Matchless is a very promising design. There is no reason why a powerful engine of 700 c.c. should weigh more than 45 lb., provided volumetric efficiency and speed be kept down.

### The Solo Tourist's Wants.

I have long been an admirer of "Ixon." He wields a facile pen; but sometimes, I fear, he forgets what harm his seemingly careless words may do. He has "written up" the flat twin and Revs (with a capital R), but I cannot believe he *likes revs*. May I appeal to him to "write up" *flexibility*—to demand a flat twin that shall not get the bit between its teeth?

Surely what the ordinary man appreciates above everything is the quality of flexibility. He likes an engine to *follow the controls*, as does a good car engine—to run, in fact, as the proverbial "steam engine."

I sincerely hope that our leading manufacturers will make an endeavour to produce a machine for the real tourist, emptying their minds of the sidecarist on the one hand and the speedman on the other, and considering only the genuine *solo* tourist with a sane and healthy love of the open road and the peaceful country. I have lived for three years now with "W.D." "models," and I never want to hear or see one "after the war."

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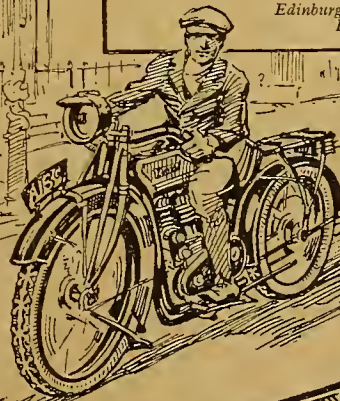
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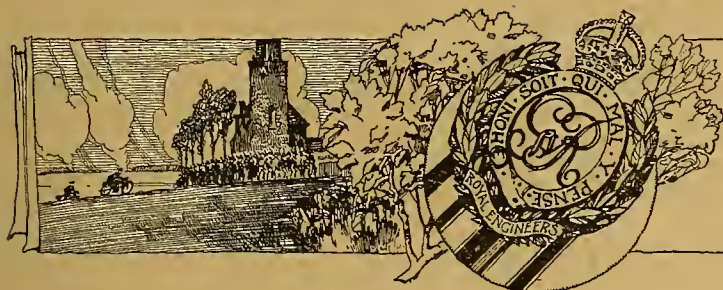
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## MILITARY NOTES.

### AN AIRMAN'S DEATH.

WE much regret to record the loss of another enthusiastic motor cyclist, Sec.-Lt. R. M. Whitehead, of Barlow Moor Road, Didsbury, who met his death whilst flying in France on the 22nd of November.



Lt. R. M. Whitehead, R.F.C., who brought down two enemy planes, and was twice mentioned in despatches.

He was a clever rider, and a thorough sportsman of the best type. Joining the R.F.C. last January, he obtained his commission in May, and his wings in July. He was on active service about ten weeks, piloting a "fighting scout," during which time he brought down two enemy airmen, and was twice mentioned in despatches. He entered the recent controversy on average speed, his letter appearing on October 6th, and was an occasional contributor of articles.

### MAJOR REG. HOLLOWAY, R.F.C.

CONGRATULATIONS to Maj. Reginald Holloway, R.F.C., who has now obtained his wings. "Reg" Holloway was one of the trial experts of pre-war days, when he rode Premier motor cycles in all the important events with singular success. He is a native of Torquay, and on joining the Premier Co. made his first public appearance at the Streatham Hill-climb of 1911, where his method of cornering created something of a sensation. He was reputed to be the originator of the leaning-on method of cornering at speed, but Holloway himself made no such claim.

He was picked to form one of the English team which went to Holland for the Dutch Trials of 1912. He also rode in the T.T. of 1913, and obtained certain notoriety by riding from Coventry to London on one charge of oil.

Just prior to the war Holloway joined the late John Gibson in a motor agency business at Torquay.

### DEATH OF LT. C. O. RAYNOR.

NEWS comes from Vancouver of the death of Lt. C. O. Raynor, R.F.C., who joined up shortly after the outbreak of hostilities. For some time he was with the aviation corps at Minoru Park, Vancouver, and graduated about nine months ago. After only five weeks' service in the R.F.C. in the fighting

line, Lt. Raynor was killed in action. He took a great deal of interest in club and similar matters. His father, Sgt. Raynor, is still in khaki, and he has two brothers fighting as well in France.

### D.R.L.S.

IN an interesting article in the *Manchester Guardian*, Capt. F. E. Wynne gives some interesting details of the work of the Despatch Riders Letter Service—commonly known as D.R.L.S.—in Egypt and Palestine.

"In Egypt and Palestine, at all events, practically the whole of the carriage of messages is done by motor cyclists, and I am sure these men are second to none in the British Army for skill, daring, and endurance. One was not accustomed to regard motor cycles as cross-country vehicles, yet most of their work, on this front at all events, has been done over an almost

trackless desert. There is hardly a moment or a spot in all the area of operations that you will not see them, perhaps a black speck in the distance, moving with astonishing rapidity, now across a sea of dust covering a surface that must consist of nothing but bumps, plunging into heavy sand and getting through it somehow, emerging into higher land ploughed in ridges, baked as hard as brick, and still covered with a crop of barley, sometimes checked for a moment but always getting on, always somehow finding their way to their destination across a country that is practically without landmarks. In their speed, their pertinacity, and the amazing obstacles they overcome they remind me of the black ants of the desert, which always travel at full speed straight for the place they are going to, up and down precipices, generally carrying a load about five times their own weight, and always apparently sure of their way home. One day last spring I made my first acquaintance with the 'wadi.'

"Our course lay up the dry bed of the watercourse, because we would have been exposed to fire on the comparatively easy going of the high ground above it. There was a blistering sun reflected from the glaring boulders and patches of gravel and the occasional outcrops of flat rock that form the bed of the 'wadi.' Our horses stumbled and suffered, the mule teams laboured pitifully, dragging G.S. waggons and sandcarts. Officers and men sweated and swore.

"Suddenly I heard the familiar 'tut-tut-tut' of the cycles. It seemed impossible, but on they came, overtook and passed us, somehow keeping their engines going over that frightful surface, often helping the machines along with their feet, sometimes helping each other to lift them bodily over spots where even they could not keep them on their wheels. They were out of sight in a moment, and one realised the immense value to the country of all that passionate devotion which was given in pre-war days by youths of all classes to these conquerors of space."



A French contributor, H. E. Plateau, on the great road from Eprenay to Chalons. His mount is a 4 h.p. Triumph.





## TIMES TO LIGHT LAMPS.

## GREENWICH TIME.

Dec. 13th	...	4.19 p.m.
" 15th	...	4.19 "
" 17th	...	4.20 "
" 19th	...	4.20 "

## A Successful Year.

At the twenty-first annual shareholders' meeting of Messrs. J. B. Brooks and Co., it was recommended that a dividend of 10% be paid, and £5,000 placed to reserve.

## The Tank Bank's Triumph.

The Tank Bank campaign ended last Saturday night after a remarkably successful week. The sum of £3,423,264 raised surpassed the highest anticipations of the promoters who originated this idea of attracting investors.

## Motor Ambulance Sidecar.

In addition to the very generous offer made by the Campion Cycle Co. to the Easting Windscreen Co. for an ambulance sidecar outfit, to which we have already referred, generous offers were also made by the Colmore Motor Cycle Depot, Birmingham, and the Empire Sidecar Co.

## Motor Cycle Police and New Order.

From a summons at a S.E. court last week it appears that the police are using motor cycles to enforce the new Order. A police inspector, in evidence, stated that he mounted his motor cycle and overhauled and stopped the driver of a car. The latter was fined £14 for not having a petrol permit and using an improperly registered car.

## County of London Motor Volunteers.

The County of London Motor Volunteers are doing most excellent work at the London stations at night, looking after the boys as they come and go from the front, and taking them to the different hostels up to as late as half-past two in the morning. Their O.C. is now working under the new Order, A.C. 1, 1,073, in enrolling heavy vehicles and men for transport work in case of invasion. Two motor cyclists are required for each section, but they will not be required to undertake any immediate duties, and the appeal is now being made in order that their services may be available if the need arise. Full particulars can be obtained by calling at the Polytechnic Room, 5, Regent St., W.1, on Friday evenings, between five and eight o'clock.

## SPECIAL FEATURES.

## SPONTANEOUS IGNITION.

## AERO ENGINES: THE ROTARY.

## SCHEMES—POINT AND POINTLESS.

## National War Relief Funds.

At the week-end the principal war relief funds stood as follow:

The National Relief Fund (distributed £3,728,472)	..	£6,300,225	0	0
Red Cross Fund	..	8,212,400	0	0
King George Sailors' Fund	..	88,967	0	0
Tobacco Fund	..	101,600	0	0

## Ode to the Tanks.

On Thursday last (Scotland's day) the Tank in Trafalgar Square was presented with an illuminated device bearing the words:

"So small a shield to bear so great a sign!  
 'So small a shield to hold so great a blade!  
 England, in this the darkest hour of thine,  
 'Tis those who know thee best are least afraid."

That the Scot entertained no fear as to the outcome of the war is shown by the £150,000 he contributed on that day

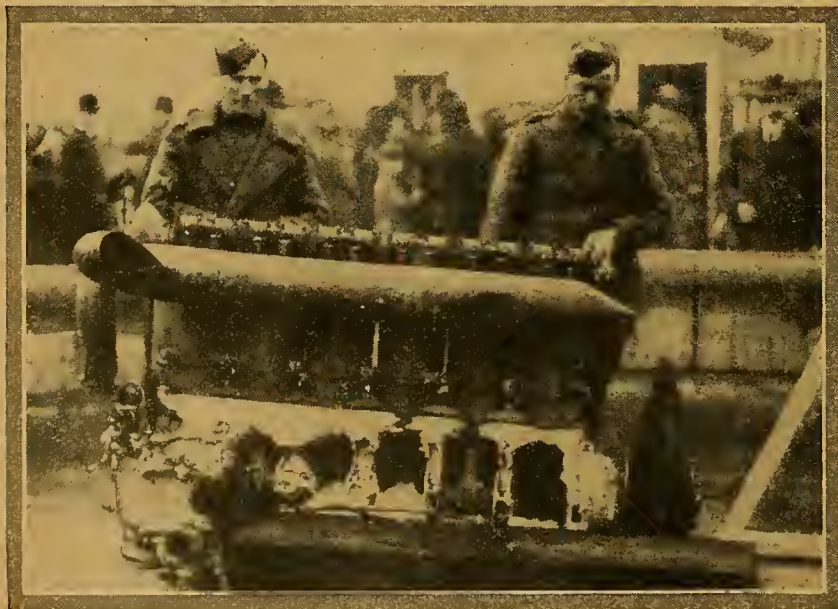
## The Dealer's Defences.

Probably everyone has at some time wondered where on earth the numerous rumours always floating round at the present time have had their origin. A good example of a "well-informed, source" came to the notice of a member of our staff when recently visiting a well-known Midland dealer. Like all other dealers, this particular one has found himself compelled to turn to other activities in order to justify the maintenance of his premises, and his own particular effort consists in the testing of small electric generating plants, the motive power of which consists of a well-known motor cycle engine.

## The "Boom of Machine Guns."

The exhaust pipes of these engines are led into two long exhaust pipes about 3½ in. in diameter, which in turn, projecting some three feet through two upstairs windows, exhaust into the street. An excitable old lady, noticing the two projecting stove pipes, soon set well going the latest secret information that "They must be expecting enemy aircraft round here, as those motor works have two anti-aircraft guns all ready."

We wonder if the old lady's suspicions had been confirmed by her hearing the drone of the exhaust, and by thinking this must be the boom of the guns at practice? This reminds us of the recent piece of brilliant description in a learned "daily" referring to the "boom of machine guns!"



One of the pair of 260 h.p. Mercedes engines fitted in the Gotha aeroplane brought down during the last raid on London, and exhibited in Trafalgar Square last Saturday. The bore of the cylinders is 160 mm. and the stroke 180 mm., the capacity of the engine being 21,720 c.c. The fuel consumption per hour is nineteen gallons, oil 8½ pints.



**An Honest Admission.**

The Hendee people send us a letter from a rider who is candid enough to own that trouble he has experienced with his engine is due to bad lubricating oil—surely the first case on record of such an admission having been made to a firm of manufacturers!

**Coal Gas for Fuel.**

We are informed that Sir Boverton Redwood will be chairman of the Gas Traction Committee, appointed to consider the use of gas in place of petrol. Mr. E. S. Shrapnell-Smith is acting as secretary for the time being, and all communications should be sent to him at 8, Northumberland Avenue, London, W.C.2.

**Timber replaces War-worn Motor Cycles.**

Passengers on a S.E. branch line have been interested in the change wrought at a M.T. depot skirting the railway where hundreds of war-worn motor cycles attracted attention for some time. Now they are removed and huge piles of timber have taken their place, and Colonial lumbermen are to be seen. At the workshops most of the plant has been removed, and the cheery motor cycle mechanics, who used to exchange greetings with the railway passengers in passing S.E.R. trains, have also gone. Only a heap of war-worn motor lorries remains visible, mostly scrap and beyond repair.

**The Military Medal.**

The King has been pleased to approve of the award of the Military Medal for bravery in the field to the following ladies: Miss Marie Lambert Chisholme Gooden Chisholme, and Baroness Elsie Blachall de T'Serclaes, Anglo-French Hospitals Committee.

We have on several occasions referred to the magnificent work these two brave ladies have performed on behalf of wounded soldiers of the Belgian Army. They have lived for practically the whole of the war at Pervyse, just behind the Belgian Front, and actually under fire, and have used their Douglas motor cycles during the whole of that period.

It may be remembered that in our issue of November 15th we illustrated a Matchless sidecar, fitted with a special body for carrying wounded soldiers, which was to be used by these two ladies.

**Middlesex Motor Volunteers.**

The Group Headquarters of the Middlesex Motor Volunteer Corps were opened last Monday at 19, Queen's Parade, Muswell Hill, by the Commanding Officer, who appealed for more volunteers, especially motor cyclists. This section is not quite up to strength, and as the work being done at present is invaluable it is hoped that all cyclists in Middlesex will enrol. The nature of the work undertaken at present is chiefly connected with the transference of troops across London—during the night and early on Sunday morning. This work is greatly appreciated by the soldiers, and one has only to turn out one evening to realise this fact. Immediately recruits have been passed as efficient in squad drill, uniforms will be provided free of charge. Full particulars can be obtained from Cpl. Cyclist Ballard, 133, Archway Road, N.6.

**A Way they have in the Navy.**

A naval officer, on hearing of the new petrol restrictions, wrote to the Petrol Controller's Department of the Board of Trade, and asked them to give him a petrol licence or else stop this war and start a new one with petrol for all. He informs us that they chose the easier way, and replied that when he was about to proceed on leave he could have a licence for six gallons. The Navy usually gets there!

**The Technical Committee of the Motor Industries.**

As most of our readers will be aware, standardisation is a question that has for some time been occupying the attention of those who count in the motor trade. The Engineering Standards Committee have recently published three reports, which may be obtained from them on application to 28, Victoria Street, London, S.W.1, price 1s.

The reports are as follow:

No. 71.—Report on British Standard Dimensions of Wheel Rims and Tyre Bands for Solid Rubber Tyres.

No. 80.—Report on British Standard Dimensions of Magnetos.

No. 45.—Report on British Standard Dimensions of Sparking Plugs.

**The Use of Coal Gas.**

We have received the following notice from the British Commercial Gas Association: With a view to determining exactly what points—both of principle and detail—require discussion, investigation, or possibly research and experiment in connection with the use of coal gas for motor fuel during and after the war, the British Commercial Gas Association has recently invited into joint conference representatives of the Commercial Motor Users' Association, the Motor Traders' Association, and the Society of Motor Manufacturers and Traders. This, it is hoped, will ensure that all questions will be considered from all the various points of view, and that overlapping in investi-

gation and discussion may be avoided. It is a happy coincidence that the president of the British Commercial Gas Association for the current, as for the past, year is Sir Hallowell Rogers, chairman of the B.S.A. Co., and deputy-chairman of the Daimler Co.

**Motor Cycle Policemen.**

We have several times in *The Motor Cycle* referred to the enthusiastic manner in which the various police forces in the United States have taken up the motor cycle. We now learn that the Rochester (N.Y.) Police Department have added six Harley-Davidsons to their equipment, and that their special sidecar bodies have been designed by the deputy-chief of police.

**Motor Cycle Draw in Wales.**

We have received a letter from the North Wales Motor Exchange, Wrexham, thanking us for the paragraph we inserted concerning the draw for a motor cycle which they are organising for the purchase of a hand for the 17th Batt. Royal Welsh Fusiliers, as a result of which "applications for tickets have been simply pouring in, and it looks like being a great success."

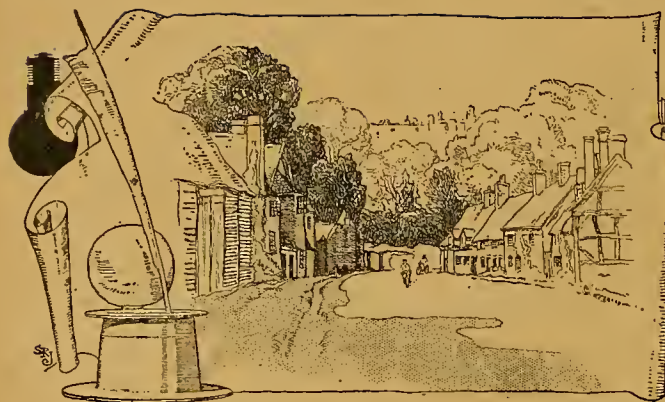
**Sparking Plugs.**

We have to live on rumour nowadays, and the following is one we recently overheard as it was going the rounds: The Government has on foot a scheme for a standardised sparking plug, and one design of plug is to be adopted for use at the various theatres of war in all engines that require sparking plugs—motor cycle, Ford van, motor car, and aeroplane are all to be equipped in the same way. When one considers the evidence recently published in our columns as to the absolute necessity of a special plug for a special purpose, one cannot help but wonder if the official or department responsible for this latest step really knows what a sparking plug is. All this, of course, if the rumour turns out to be true.



Official photograph taken on one of the British fronts, showing machine gunners wearing their trophies.





## At the Clubhouse.

### No. 2.—PETROIL LUBRICATION AND CASTOR OIL.

I WAS seated in the easiest chair I could find amusing myself by reading the current "Questions and Replies."

Dibbs was busy by the writing table hunting out bargains in cheap tyres at the end of *The Motor Cycle*. "Funny thing," said he, "I've never yet been done with a 'cheap' tyre, and I've had scores. I expect somewhere there lies a rotten one with my number on it."

I was about to make some sort of comment when Smithkins's head appeared in the doorway for a moment, during which time he shot the following at Dibbs. "Hullo, been trying castor oil lately?" And we heard him chuckling as he crossed the passage to the top of the steps leading to our workshop and garage.

Dibbs and I looked at each other and grinned. "Getting a bit of his own back, I suppose," said Dibbs. "Why he should take it out of me I don't know. Anyway, castor oil's rather ancient history, isn't it?"

It must have been about the commencement of the war that the incident occurred. Two facts help to fix it somewhat, the first being that we had about half of a forty-gallon drum of benzole left, and the second that Dibbs was running a 1914 two-stroke Clyno, which he had possessed about a couple of months.

#### The Trouble.

Biffles and I having just returned from a run were looking through the open window into Main Street observing the passers-by. Our town is very crowded only on market days, consequently Dibbs, who was pushing his machine out of the archway underneath us, had plenty of room for a flying start. He bent down, tickled the carburetter, and went briskly through the performance of starting. He had a fair speed up in about five yards. Down went his compression release, and he was in the saddle. Not a fire or a puff from the engine. Dibbs seemed rather surprised. Looked at his taps and levers and repeated the performance. This time, however, he took care to give his engine time to fire distinctly before jumping into the saddle. I say he took care to give it time—but it didn't fire; at least, we never heard it. He had now got out of our range of view and ceased to interest us. We had begun to discuss an incident which had nearly put an end to our afternoon's run when—it must have been a quarter of an hour after he disappeared—Dibbs slowly hove in sight. He was rather

red in the face, and had every appearance of having been undergoing some unusual exertion. He had the engine in "free," walked it under the archway, banged the workshop door open, and lugged his machine up on the stand. We could hear all this. Then slowly he made his appearance upstairs.

"What the deuce is the matter with my machine?" said he. "Can't get the dashed thing to fire at all. Wouldn't give a murmur first hundred yards. I've run the darned thing up and down as I've never run a machine since I had my first in '05. Tried everything I can think of—carburetter, spark, all the lot. Besides, it was all right when I came in last night. I say"—a sudden thought seemed to strike him—"Any of you fellows been playing monkey tricks?" We each and severally denied the soft impeachment.

"Let's have a look at it," someone suggested, and we all went down together.

#### A Consultation.

We regarded the inoffensive looking little machine curiously, for Dibbs is rather a "dab" at practical motor cycling. I was just about to suggest trying to start it with the back wheel when Biffles, who had been peering at the carburetter connections, put his finger on the oily mess which had collected there, and asked, "What oil are you using?"

"Castor oil," answered Dibbs, and before Biffles could make any remark, he added, "That's all right; been running on it three weeks now. Chap in Birmingham recommended me it; said it was the coolest thing out for two-strokes, and quite suitable, as there were no valves in the engine. I tried it, and it answered fine."

Biffles regarded him quietly. There is no apparent superiority about Biffles. "And when did you fill up last?" he asked.

"Let's see. Ran out of juice last night just opposite Topping's garage at Highboro." Said to him, "Any benzole?" "Nix," says he. "All right, shove in a gallon of Shell, then," and he did. I rode straight here on it."

"Previously, I suppose, you have run on nothing but benzole?" said Biffles.

"That's so; but what the deuce has that to do with it?" asked Dibbs, whose temper was not improving under this cross-examination.

"Well," said Biffles, "just get me that test tube off the shelf above my locker."

I was nearest and handed him the test tube.

"Now run me an inch of castor oil into this," he went on. "I will add a couple of inches of petrol from my tank drain tap. That makes 3in. in all. See it?"

He held it up for us to see and then shook it up.

"Anyway," said Dibbs, "it's all right. Bit misty looking perhaps—"



At the Clubhouse.—

Biffles ignored his remarks. "Just place it over by the window there and watch it for two or three minutes," said he, "then I think we shall solve your trouble."

With this half promise we had to be content. The test tube was placed by the window. All eyes were on it for the moment, but attention must have roved, for it was Dibbs himself who startled us by saying. "Why, it's settling out." So it appeared. "But there's more of it," he added, cryptically, rather than correctly.

#### The Explanation.

"I am not a chemist," said Biffles, "but I believe I am using the correct terms when I say that castor oil and petrol are mutually soluble in equal proportions. At any rate, you see what I mean by the example here. So you will understand that if you add a gill of castor oil to a gallon of petrol it will "mix" with a gill of petrol only and leave the remainder of the petrol free.

If the whole lot is violently shaken up a sort of emulsion will be formed, but on allowing it to stand the castor oil and petrol solution to the amount of two gills settles out. Now when Dibbs had his gallon of petrol put in yesterday his carburetter would fill up with pure petrol, and, consequently, he could start all right. By reason of the shaking up his machine got he would notice no difference before he got home. He leaves his machine all night and to-day standing. The castor oil and petrol solution settles out, and he tries to start up on a mixture half petrol and half castor oil. We know the result. If he had persevered a little longer he *might* have shaken the lot up sufficiently to start."

"But," I chimed in, "why has he never had the same trouble before?"

Biffles slowly brought his gaze round to the half empty drum of benzole, where it rested. "Castor oil and benzole are mutually soluble in any proportion I believe," said he.

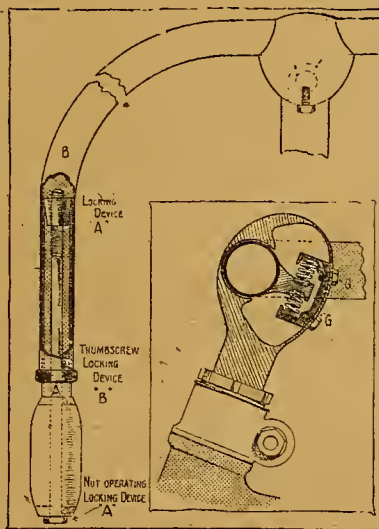
ENGRO.

## A SPRUNG HANDLE-BAR.

A Handle-bar adjustable in a Vertical Direction and sprung to absorb Shocks.

FOLLOWING on our description in *The Motor Cycle* of November 22nd of some recently patented spring frames, we are now able to describe a springing device applied in a more unusual position, viz., the handle-bars. Mr. A. S. Evans, of Maldon Road, Lower Edmonton, has recently patented a handle-bar which is designed to take the place of the three existing types, i.e., T.T., semi-T.T., and Touring.

This handle-bar is permanently sprung at the steering head by the attachment made clear in the illustration, and the bar is also adjustable for length and for slope. It may be raised or lowered by loosening the nuts marked G, and fixed by tightening them when the handle-bar has been placed in the required position. The length of the bars is adjustable by means of the tube A moving inside the tube B, which, in the normal course of riding, are held together by locking devices A and B. To alter the length of



A recently patented telescopic spring handle-bar.

the handle-bar the nut at the end of the grip is loosened; the locking nut B is also loosened by the fingers, and the handle-bar may be then adjusted to the required length and relocked by the tightening of the nut A, and of the thumbscrew operating the locking device B.

The idea of a sprung handle-bar is not, of course, entirely new, nor is that of a handle-bar adjustable to give either T.T. or touring position. This is, however, if memory serves aright, the first time we have seen suggested a handle-bar combining both these properties. The sprung handle-bar never seems to have been a great success, but this particular example seems to be made on more substantial lines than the majority of its predecessors, and the inventor assures us that it has given most satisfactory service on test. The inventor, by the way, is anxious to get into touch with someone who will help him to place this device on the market, or take up its manufacture.

## THE USE OF PETROL.

WE have lately had letters from correspondents asking if, on the occasion of their selling their motor cycles, it will be legal for them, under the Motor Spirit Restriction Order, to deliver the machines by road to the purchasers. To make sure that such use of motor spirit would be allowed, we queried the Petrol Control Department on the subject, and the Department replied to the effect that anyone who has sold a motor bicycle and desires to deliver it to the purchaser must apply to the Petrol

Control Department, 19, Berkeley Street, London, W.1, for a licence to do so. The Deputy Controller goes on to say, "It would be open, of course, to the purchaser to fetch it if on taking delivery he drove it for a purpose permitted by the Order." Cars and motor cycles in the hands of a member of the trade are permitted to be driven for demonstration purposes, and, in the opinion of the Controller, this would fall within the expression "for business purposes."



# THE Critic

Fireside Chats on  
Motor Cycle Problems

## COAL GAS OR—NOTHING.

THE Manufacturer said he would not be found dead in a ditch with a gasbag behind his motor cycle—a decision which, the others agreed, was a very natural one.

"You wait, old son, till it's either a case of a gasbag or no riding at all," said the D.R. "I guess you won't be so jolly particular then."

"I think I'd prefer to wait till the Wood-Milne bolster is procurable before I try gas," replied the Manufacturer.

"Then I'm thinking you will have to wait a long time," the Journalist put in. "In my opinion, the pressure cylinder won't be ready till after the war; then we shan't want it."

"I think I shall," said the Novice. "To me, a family man with a modest income, the idea of sixty miles for ninepence is rather attractive."

"Sixty miles for ninepence be hanged!" snorted the Manufacturer. "You are forgetting to count the initial cost of the bolster, its rapid depreciation, all the necessary impedimenta in the way of a reduction valve, etc., quite apart from the cost of filling, which will be about equal to the amount of gas actually charged. Then again, where are you going to carry the bolster?"

"Under his arm, of course," suggested the D.R.

"Between the cycle and the sidecar," replied the Novice.

"Phew!" sneered the Manufacturer. "Just you measure up the size of bolster you could carry there—about enough to carry you sixty miles! Then imagine the difficulty of recharging on tour! No; the bolster may come in for commercial cars, which can mount it in a well sprung and properly sheltered position, but never for motor cycles."

### The All-important Question.

"I wouldn't swear to that!" put in the Journalist. "It is quite possible that we may have light specially constructed sidecar attachments, mounting a streamlined pressure container equivalent to one and a half gallons of petrol, which would be quite an acceptable proposition, even after the war. I believe that, counting initial cost, depreciation, and everything, gas would still remain much the cheaper fuel of the two."

"I don't know," argued the Manufacturer. "You can reckon that the initial cost of your gas outfit will be equal to two hundred gallons of petrol at 2s. 6d. a gallon, i.e., enough petrol to carry you 13,000 miles! How long is it going to take the average rider to save the initial cost? At the end of

about 20,000 miles he will begin to get a little of his own back; then he will require a new gasbag!"

"Gee whizz!" cried the Novice. "I never regarded it in that light. You are calculating that the gas sidecar attachment will cost roughly £25."

"Sure," agreed the Manufacturer. "I guess you won't get one at much less—not a really dependable and durable article. But, even if you halve that figure, the investment would not pay any ordinary rider, especially when you consider the fact that he will get only 80% of the power, and that recharging will be a most intolerable nuisance. I would not mind betting that the only people who use gas are firms having several vans in operation, and who can afford to have a stock of interchangeable cylinders and their own charging plant."

### Not a Permanent Demand.

There was a moment's silence, then the Journalist drawled, "Like many manufacturers, you don't appear to be very well versed in what's going on in the world. As a matter of fact, most elaborate arrangements are being made for the convenient running of commercial vehicles on gas."

"I know that, sonny, but it will never affect you and me," replied the Manufacturer. "Until after the war motor cyclists won't be able to get pressure containers even if they want them, and after the war, with benzole and petrol to be had, they won't want them, even if they can get them. The atmospheric pressure gasbag is the only makeshift for motor cyclists—and very much of a makeshift at that."

### PUBLISHERS' ANNOUNCEMENT.

## Christmas Holidays

Owing to the forthcoming Christmas Holidays, next week's issue of

"THE MOTOR CYCLE"

will be published a day earlier than usual, and will be obtainable everywhere on

WEDNESDAY, DEC. 19th,

instead of Thursday, Dec. 20th.

ILIFFE & SONS LTD.

"It's a beastly contraption, I agree," said the D.R. "But if it will keep us going between business and home—if it will enable us to enjoy a breath of fresh air instead of fighting for a seat in a crowded, fusty omnibus or tram, surely it is worth while? Say it takes you thirty miles at the utmost —"

### The Simple System.

"That," the Novice interposed, "enables you to spend part of Sunday on some grassy bank, where the infant can eat earwigs and the wife can catch cold uninterruptedly, instead of frothing indoors over a gloomy Sunday paper. By the end of the war the family will probably have become somewhat extended, and we shall then be able to fix the trailer up with little seats, and all hie off on pure petrol and with 20% more power than we are used to! Yes, I'm all in for the trailer."

"You will be, my son, when next springtime calls, and you have to make your business trips by tram," the Journalist pointed out. "If the Government, in their dead set against private motoring, ultimately stop the use of coal gas for private use, I shall consider they are guilty of another act of extraordinary folly. There is no petrol to be had, therefore we must forego the use of it with good grace, but there is, and always will be, coal gas sufficient for the few who must remain on the road. All this rot about the converting of vehicles for the use of gas absorbing valuable labour sickens me beyond words. The matter is in the hands of the Government, and if labour is being wasted in that way, let the Government step in and stop it where it exists, giving the firms concerned Government work to do instead. But—and this is the point—no useful purpose could possibly be served by forbidding the use of coal gas. It would simply be a spiteful act, encouraged by that section of the press which plays up to the class who cannot afford motors of their own, and therefore hates to see other people using them."

Finally the Manufacturer weighed up the situation pretty effectively as follows: "Any sort of container," said he, "can be counted as useless unless it is sufficient for thirty or forty miles without recharging. Therefore the flexible bag is taboo for cars, and the expensive pressure system, with its various complications, is the only thing. With motor cycles, on the other hand, the cheap and simple system can be applied in a reasonably practical form, and therefore the more costly system may be set on one side."





## SCHEMES—Point and

## Pointless.

## EXPERIENCES IN THE TRAINING OF DESPATCH RIDERS.

**I**N THE course of the training in this country the motor cycle despatch rider goes through many schemes, and it is a lamentable illustration of the fact that the best intentions of his instructors go astray when I have to add that the average recruit of to-day seems to have the opinion that point schemes are pointless! There are a select few who really see that they are helping

on the war by going to "the county boundary mark half a mile N.N.W. of the first D in Puddleton, two and threequarter miles S.S.E. of Grimsby," there to find a check, who will time him in and send him on to some equally important point—but not many, I am afraid.

To the pre-war rider who is conversant with the trials of the old type, it may be of interest to give a few details of the trials—not to mention troubles—the D.R. has to undergo before he is the polished article. These schemes are not without their humorous incidents, one or two of which I relate below.

The general system of these point schemes is as follows: I do not think I am giving away any military secrets. We go out to some point where we concentrate. The men are sent out to various points, where they find checks, who send them to other points. These are arranged in a circle, and each man is sent on runs which are roughly diameters of this circle, so that he is always passing near the petrol depot where he can get petrol, oil, etc., and assistance in any big repair necessary, and, in case of need, a lorry to bring him and his machine home if "diss."

**Map Reading.**

Lots of funny things happen in these schemes. As a rule the onlooker sees most of the game and fun. The points given are as a rule known before they are put on the scheme paper, but very often points are taken which look "good" on the map, and that is the cause of amusing incidents very often. All men are liars, we know, but not such skilled ones as a half-inch ordnance survey map. We looked up a delightful spot, far from towns and houses, where a watersplash was shown, and we said, "We will have a check here, and they shall go through the splash." We informed a few select people, who all decided to come and see it. The news spread, and rumours got about that the depot was going to send a lorry to take passengers at sixpence a time, and that the local cinematographer would be there! Well, several of us went there on the day, and found that instead of a watersplash there was a very nice brick bridge!

Still, we have been able to pick out some *very* nice points from the map. One in particular, which was a county boundary mark in the middle of a river (according to the map). The check was generous, and decided the bank of the river was near enough. T roads again are a great source of uncertainty. One gives a T road junction as a point, usually on a third-class road, and the farmers have a way round these parts of ploughing up roads, so that quite a lot of these do not exist now! All of which makes for excellence in map reading.

**A Corporal's Dilemma.**

The great scheme of the week though is the two-day scheme, when we go out to invade various towns with divisions, heavy artillery, etc., all complete. We have about ten units posted in various parts of the county, and three or four positioned during the day representing the advance or the retreat. This is where we usually get casualties and crashes. We get on some appallingly narrow and winding roads, and a man learns to ride in traffic under these conditions or else smashes himself (which the Army is sorry and a bit peevish about) and his machine (which is serious and a punishable offence). One unit once got to a cold and shivery place on the Chilterns where there seemed to be no accommodation at all, and the corporal in



"And found that instead of a watersplash there was a very nice looking bridge."

charge happened to notice a car with an officer in it—a major—and approached him. Followed a salute and an enquiry as to where a signal office and billets for the night might be obtained for the men. Affable major says, "Come along with me." Chats thirteen to the dozen, puts the signal office in the back of his house near by, and shows the men a barn to sleep in.



## Schemes—Point and Pointless.—

and, turns to the corporal, still more affably, "Come up to the house and have a drink and I'll give up a bed." Considerable astonishment on the part of the corporal, who went out in 1914 with part of the Regular Army and had not experienced great cordiality on the part of majors. Thinking hard, it dawns on him that he is wearing a Burberry, and the light is bad, and the major may be short-sighted. Decides to hedge until more certain of his ground. "Thank you, sir, but I have to get back to Windup to-night." "Oh yes, yes; I suppose you leave a sergeant in charge here and make yourself comfortable for the night. Quite right; yes, yes." "Oh, o-o of course, sir; y-yes, exactly!" Corporal quite sure of his ground now. Major thinks he is an officer. Later, while in the signal office—corporal hears the major's voice "off"—does an undignified dive into the corner and camouflages himself with a spare inner tube and a spanner, and makes a noise like a diss motor bicycle. Enter Major: "Has your officer returned yet?" "No, sir." "Well, tell him to come up to the house when he comes back.



"We get on some appallingly narrow and winding roads."

Good night." Corporal spends the rest of his time creeping about lonesome parts of the district.

## The Answer.

Sometimes, when short of D.R.'s for scheme, we have fewer units and make the remainder imaginary, perhaps posting a N.C.O. to represent the unit. A message came through once from some unit to say that a D.R. had met an imaginary D.R. of the imaginary umpteenth division with an imaginary "diss" to his imaginary magneto. Would we please send an artificer? So we did—an imaginary one—and all was well.

I have said we have crashes on these schemes. On returning once from scheme the officer who had been in charge, who took life very seriously, was met by a disbeliever, who said, "Well, Joe, have you killed anybody this time?" Great indignation on the part of "Joe," who, while endeavouring to bottle his righteous wrath and crush his interrogator with a few well-chosen words, is interrupted by a quiet voice belonging to an ex-D.R. saying, "The answer is in the infirmary!" Rather unkind, wasn't it? OICINS.

## Renovating a Petrol Tank.

**N**O doubt many motor cyclists would be glad to know of a means whereby they might cheaply and efficiently renovate a petrol tank, the enamel of which has become shabby. This is the method I adopted with mine:

Firstly, I tried two different brands of enamel which were stated to give excellent results on metal, but, not being satisfied with either, I stripped the tank by soaking the enamel well in a hot solution of washing soda (one pound of soda to half a gallon of water), keeping both the oil and petrol caps in position to prevent the solution getting into the interior of the tank. When thoroughly clean and dry, I applied with a very fine brush a solution of shellac and methylated spirit, prepared by dissolving four ounces of shellac in half a pint of spirit, with the addition of half an ounce of spirit black to colour the solution, black being the decided colour. Leaving the tank to dry overnight, I applied a second coat next day, and, after letting this coat dry, I proceeded to apply more solution by means of what French polishers call a "rubber" made by wrapping half an ounce of cotton-wool in two pieces of soft rag about six inches square, first saturating the cotton-wool with the solution of shellac. The tank was gently but firmly rubbed in long strokes with the rubber, occasionally touching the rubber with the

finger tips dipped in linseed oil. The resulting surface is jet black, smooth, and very pleasing to the eye, and is proof against petrol and oil. The rubber needs replenishing with polish occasionally.

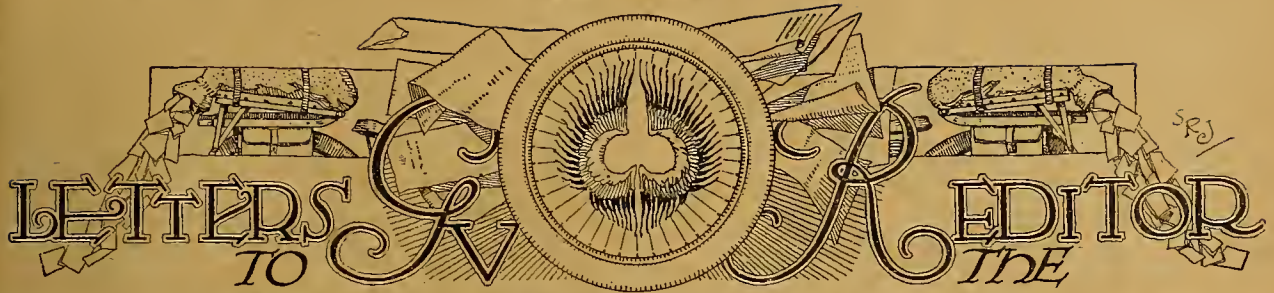
## AIRCRAFT WORK BY SMALL FIRMS.

**A** CONFERENCE was held at the Central Hall, Westminster, on November 29th, to consider the question of how small firms might be co-opted in the production, on a quantity basis, of aeroplane parts, and after some discussion the following resolution was unanimously adopted:

"That this conference approves of the object placed before it, which is immediately to utilise for the national benefit the productive facilities offered by engineering and other firms not fully occupied on war work; that a committee be herewith formed, with power to add to its numbers, with authorisation to speak on behalf of the conference and be provisionally entrusted with consolidating the body of firms already interested and of extending their numbers, and of devising means for immediately carrying into effect the objects of the conference as stated above; and that a copy of this resolution be sent to the Minister of Munitions, the Air Minister, and the War Council."

Any manufacturer interested in the matter who could not be present at the conference should communicate with L. Blin Desbleds, Esq., hon. director, the Aeronautical Institute of Great Britain, 3, Arlington Street, St. James's, London.





The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Herford Street, Coventry, and must be accompanied by the writer's name and address.

#### THE TRAINING OF BOYS FOR MECHANICAL UNITS.

Sir,—I was greatly interested in your leader in *The Motor Cycle* of December 6th. May I mention my own case? In a few months I hope to commence training to become an R.F.C. pilot. I have a motor cycle and a small stock of petrol substitute. Is not it rather absurd when I am not allowed to use it? I have been thinking of putting a gasbag on a sidecar chassis, but, my hat! would not a ten-mile ride be exciting? Up to now I have spent my time cleaning and adjusting, so I now have a motor cycle in perfect condition, and some petrol, but am not allowed to use them.

London, N.

BOUTEZ EN AVANT.

#### THE CHEMISTRY OF THE INTERNAL COMBUSTION ENGINE.

Sir,—The Chemistry of the Internal Combustion Engine," by Mr. Fox, in your issue of December 6th, was an extremely interesting and valuable contribution, and I think that further treatment of the same subject would meet with considerable appreciation. I wonder if Mr. Fox would mind elucidating two little difficulties that occur to me as a result of his article, though I have no doubt I am rather dense to be so completely fogged.

Why does the temperature of spontaneous ignition only affect the question of the causes of knocking when the fuel is in the liquid state? In other words, if a liquid fuel has a spontaneous ignition temperature of, say, 250° C., why does knocking result only when the fuel reaches that temperature directly in the liquid state?

Again, one of the various causes that have been suggested as possibly explanatory of some forms of knocking is that if the fuel be inadequately vaporised liquid drops may reach the interior of the engine, and then by becoming vaporised considerably raise the compression. This case surely tends to negate the probability of the spontaneous ignition theory, because the liquid on entering the engine must meet a temperature considerably above its spontaneous ignition temperature. If, however, this theory is exploded by the spontaneous ignition theory, as it perhaps well may be, then I think the answer to my first query will even gain in interest.

Coventry.

LOOT.

#### IN DEFENCE OF THE MOTOR CYCLE TRADE.

Sir,—It is now more than ever evident that the Government are treating motorists and the motor trade, under the guise of national necessity, in an absurd and ignorant manner, and in a way which is likely to kill the motor cycle trade for years after the war is over.

Their method is not helping the progress of the war, nor conserving the petrol supplies of the country, as might be done by more intelligent treatment, and, as one of the motor cycle traders, I think it now behoves us to get together before it is too late and protest most strongly.

No time should be lost, as I note an article in the *Times* referring to the probability of the Control Committee stopping the use of coal gas to those unfortunates who have been refused petrol permits in the past. We were assured that coal gas would not be objected to, and the trade has spent time and capital making arrangements to cater for users of coal gas. This rumour will be a deterrent to the successful experimenting for improvement in the use of coal gas, and is hindering progress in that line besides putting up the petrol consumption, as those who already have petrol permits will not think of using gas on a privately-owned car or motor cycle for business purposes.

The aim of the country is to conserve petrol, and the Government method of conserving anything is to treat it drastically without the least consideration of expert knowledge. They simply say, "Close up this business," and that's an end to it. They can only do this in those cases where they have no strong opposition, and that has been the reason why the motor trade has had such drastic treatment, as we have accepted all those restrictions without any opposition and in a patriotic spirit. Had we been a labour or trade union strongly represented things might have been different.

The great value of the motor cycle in utility and economy has evidently not been noted by the Government, in spite of all that the motor cycle has done for the successful prosecution of the war, and to-day they treat the motor cycle worse than any other type of road vehicle, and do not recognise it as a useful commercial vehicle.

The war is not going to be won by putting traders out of business, and the motor cycle trade has a very strong right to put forth its claims for existence in the national interest.

The American authorities are appealing for a more extensive use of the motor cycle in preference to more costly but no more useful vehicles, which consume more petrol, while this country is doing its best to put off the road entirely the handy and economical motor cycle. There are hundreds of cases where motor cycles for business use could be substituted for cars, with little hardship to the owners; in fact, with an eventual saving to them and a most decided decrease in petrol consumption, and consequent saving to the State.

High-powered cars should be barred where unnecessary, and replaced with lighter cars or motor cycles; and lighter cars where unnecessary should be replaced by motor cycles, the whole idea being to bring down the petrol consumption while still endeavouring to let the respective trades carry on. If we are to get on with the war we must have some business left in the country to meet expenses.

I address this letter to brother agents and traders. We have the right to carry on business; we have accepted too many restrictions without proper protest. Let us now organise and protest effectively. We have a strong case for proper treatment and attention, and with the satisfaction of knowing that we can serve the interests of the State in the economy of petrol by more extensive use of the motor cycle, we should not now delay a moment but get to action.

I have no doubt but that motor cyclists in general would support our protest for proper treatment, but no private motorist has the same important interests at stake as the trade, and it seems to me only possible for the trade to lead off and form the necessary organisation which, when formed, would include private owners also.

As one of the trade, I should be glad to have other traders' views on the matter without further delay than necessary, and would propose that a largely attended meeting of traders be arranged to form our union. We cannot expect much help from the manufacturers at present, as they are mostly engaged on munition work and have not the same necessity for action as the agents and traders.

If we do not do something now and at once, we may as well shut up our premises, which is evidently what the Government are trying to do for us. I shall be glad to attend any meeting in any part of the country if an important one can be convened for the desired purpose, and shall await with interest the views of other agents.

Edinburgh.

A MOTOR CYCLE AGENT.



### FLYING IN A CURVED PATH.

Sir,—Since writing my rather hasty letter recently concerning Mr. Aston's articles, I have considered the problem a little more attentively, and now find myself able to agree with your contributor's views. DYNE.

Sir,—I have read with much interest the articles on aviation matters by Mr. W. G. Aston, and I am particularly interested in the controversy *re* the effects of turning up or down wind in an aeroplane. The problem appears to me to be explained in the following.

Inertia is the property possessed by a body which resists any change in its rate of motion. It is relative to *space*. Wind speed is reckoned relatively to the *earth*.

Granted these premises, let us consider a machine with a flying speed of 60 m.p.h., flying against a wind of 59 m.p.h. The speed of the machine relative to the earth will be 1 m.p.h., although its speed relative to the air is 60 m.p.h.

On turning down wind, its speed relative to the earth must accelerate to 119 m.p.h., *i.e.*, 59+60, in order to maintain its air speed of 60 m.p.h. Now it must take *time* to do this, as a body weighing something like 2,000 lb. cannot be accelerated from 0 to 119 m.p.h. without a considerable expenditure of energy. Assuming that the engine is already on full throttle at the commencement of the turn, it follows that we cannot get more power from the engine. Since power is the rate of doing work, it follows that time is the only factor left. That is, it takes *time* to accelerate the machine, and during this acceleration the machine tends to lose height. I say tends, because it is possible to make the turn sufficiently gradual to allow time for the necessary acceleration, and the resulting drop, if any, is not appreciable. It is often well to consider extreme cases in order to make a point clear, and I trust I may be excused if I take advantage of this. Consider the case set forth above, but let the machine be turned in its own length, or practically instantaneously. At the finish of the turn it will have no speed relative to the earth, and its speed relative to the air will be *minus* 59 m.p.h.! It must, under these conditions, lose in height until it can accelerate to its normal air speed of 60 m.p.h., or 119 m.p.h. relative to the earth. This extreme case proves that the tendency exists, even if the turn is protracted. I feel sure that if this is recognised, and wider turns are taken in high winds, it will do much to minimise the danger in question. H. H. GROVES.

### THE DATE OF SECOND-HAND MACHINES.

Sir,—I am sorry to read in your issue of the 25th October that yet another motor cyclist has been refused by the makers to be informed of the date of his machine.

Some time ago I wrote to a firm of makers asking them to supply me with the date of make of one of their machines which I had purchased second-hand, but the reply I received was that they did not make a practice of supplying the date.

With you, I think the makers ought to supply this valuable information to novice purchasers, as I then was.

I am a regular reader of *The Motor Cycle*, and am glad to read those "Current Chat" notes.

HAROLD E. LORD.

### INTERNAL COOLING.

Sir,—Evidently the *reductio ad absurdum* is altogether too subtle a method of reasoning for debaters such as "Engro" and Mr. Jackson. Their letters of November 1st and November 29th respectively show that they have entirely missed the point of my allusion to insulated cylinders in my letter of October 18th, so I should like to express my views in more direct terms. The object of my letter was simply to protest against the doctrine that by forcibly restraining the passage of heat through the piston top we thereby compel the whole of the heat thus kept back to do useful work on the piston. In point of fact we do nothing of the kind. The surplus heat *must* get out of the cylinder somehow, and if it cannot escape *via* the piston it will make its exit *via* the cylinder walls. "Engro" himself seems to admit this in his original article of October 11th, but then he proceeds to argue that the more heat you transmit through a surface the cooler it becomes. This is the argument I confessed myself unable to understand, and I am still no nearer a solution.

I grant that there may be a *slight* increase in the thermal efficiency of an engine, due to insulating the piston top.

I cheerfully admit, and have never denied, that a *small* proportion of the heat which formerly escaped through the piston top may be converted into useful work. All I object to is the facile assumption that, at a hint from "Engro," all the surplus heat will desist completely from its attempts to escape, and will instead complaisantly buckle down to a bit of honest toil in turning the crankshaft and driving the machine. H.A.

Colchester.

### RUNNING ON COAL GAS.

Sir,—I have been interested lately in your articles on running a motor cycle on coal gas. It seems to me that, owing to the bulk of a container at atmospheric pressure being so great, a more economical system of carburation is required than simply running a pipe into the existing carburetter.

I have therefore thought out a simple method of altering an existing carburetter, say B. and B. or Amac, to make it function satisfactorily on coal gas, and give a constant mixture at all throttle openings. The enclosed rough sketch will show the idea at a glance, the alterations being as follow: The throttle and air slides are removed, and a new throttle is fitted with a taper needle attached. A new top plate with a central hole is required to take the Bowden wire, as one control only is required. A plate is soldered into the bottom of the carburetter, the float chamber and jet having been removed. A jet is made of  $\frac{3}{16}$  in. tubing built up to hold a ball valve, and made to screw into this bottom plate. The length of the taper portion of the needle should be exactly equal to the travel of the throttle from closed to fully open position, so that when the throttle is closed no gas can pass, and when open the full bore of jet is exposed. The air hole in the carburetter body must be filed out and built up at the bottom to the form of an isosceles triangle till the mixture is correct at full throttle. Now, supposing the throttle to be half shut, the jet area will be one quarter of the full aperture. Also the air hole, if an isosceles triangle, with apex downwards, will also be one quarter of its full area, so that the air varies as the jet, and a constant mixture should result. Extra air holes could be made round the base of the carburetter body, covered by a band to allow for change of atmospheric conditions. A cowl over the main air hole turned downwards would probably prevent any gas from floating away out of the air port during firing and exhaust strokes.

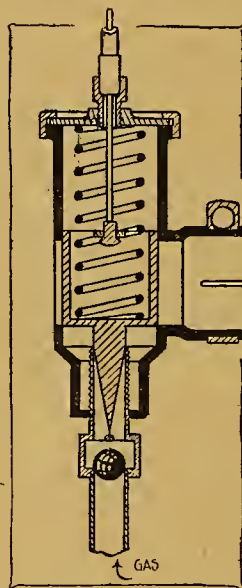
Of course, this is all theoretical, but I am converting a B. and B. carburetter, and see no reason why it should not prove satisfactory. I am not sure whether a  $\frac{3}{16}$  in. "jet" is right for a 500 c.c. single, but I do not think it would be far wrong. I shall have no opportunity of testing the idea till I go on leave, as we do not get the right sort of gas up the line here, but I shall get the conversion finished ready for that happy day.

I look forward to the blue cover each Sunday, as even though I cannot go for joy rides or trials any more, I like to keep in touch with the finest of sports.

R. B. CLARK (Lt.).

### TRENCHANT CRITICISM.

Sir,—I may be wrong, but it seems to me that the writer of the letter in your issue of Sept. 20th under the above heading and signed "Artificer" has an axe to grind, or is very much inflated with his own ideas and position. His whole article is in condemnation of the war model Triumph as put out by that well-known firm since 1915, *viz.*, that fitted with the Sturmev-Archer countershaft



Alteration of an existing carburetter for use with coal gas.



gear. He admits that Triumphs "stand the racket in a wonderful manner," and in this I can endorse his remarks, as I have been the fortunate possessor of one since 1915, and have covered over 18,000 miles on it in all weathers and under conditions the machine was designed for. As the machine I now possess is the third Triumph I have had I consider I can speak with some confidence, and can say after careful examination there is not the slightest indication of new rollers or rebushing being necessary, so there cannot be very much wrong with "the very first type of roller bearing ever adopted."

As to the hubs giving trouble, I have had no experience of this, and so have had no occasion to resort to those of other manufacturers.

Then "Artificer" complains regarding handle-bar, carrier, etc., but why should he wish to lay down the law on such matters? Each rider has his own ideas as to these, and what suits one does not suit another.

The Sturmey-Archer countershaft gear is one of the simplest on the market, and I am inclined to think that if he will disabuse his mind of prejudice and take a hint or two from one who can ride he will find the manipulation of the change-speed gear simple and easy.

I agree with his remarks regarding the rear brake, but, having altered mine to the compensating type suggested, I find it is more powerful, but this again has the tendency to lock the back wheel and thereby the tyre skids easily on greasy roads.

The spring fork is by no means ideal, but in my opinion it is as good as any on the market, and better than most, inasmuch as the forks bearing can be adjusted, thereby eliminating all rattle and jarring, and again even in the event of the fork spring snapping—as most springs do at some time or other—it does not prevent the machine from being ridden.

My Triumph has given me entire satisfaction throughout, and with a slight alteration to carburetter I have done long runs on top gear, viz.,  $4\frac{1}{2}$  to 1, with consumption of fuel as follows:

Petrol at the rate of 136 m.p.g., white oil at the rate of 144 m.p.g., vaporising oil at the rate of 125 m.p.g., and paraffin at the rate of 126 m.p.g.

The above are my best results, all being measured, and the road speed kept up to 30 m.p.h. as much as possible.

Other than the entire satisfaction given me, I have no interest in the Triumph Cycle Co.

Partick.

THREE TRIUMPHS.

### GOODS MADE IN GERMANY!

Sir,—As I do not consider a sporting paper a fit and proper place for political propaganda, and as it must be apparent to all sensible men that a settlement which entails continuous economic boycott means not peace, but a continuance of the war in one form or another, I have given my newsagent notice to discontinue your paper.

CHAS. S. IVES.

[Our correspondent refers to the following notice, which has appeared in *The Motor Cycle* for many months:

"GOODS MADE IN GERMANY.—The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war."

—Ed.]

### AVERAGE SPEED.

Sir,—Re this average speed business. Now, as one who has done a large amount of competition work, but mostly dare-devil stunts, I am compelled to say that 29 m.p.h. wants some averaging for a  $3\frac{1}{2}$  h.p. for any length of time, and in comfort, and anything above 29 m.p.h. is going to tell a tale. Consider what speed is necessitated by such an average, for it is a truly curious test.

Now, in regard to this  $3\frac{1}{2}$  h.p. record, it may interest the firm concerned to know that I have police witnesses who can vouch for a velocity I once put up on a Norton T.T. as being 70 m.p.h. on a Tarmac stretch, namely, Middlewich and Broken Cross Bridge, Northwich, for I had a stop speedometer on, and was timed for the distance by a person who

officiated at the Tourist Trophy, and who tried to persuade me into a certain handicap at Brooklands.

As regards "E.K.'s" stunt on a Sunbeam, it is quite feasible on a track or speedway, but not on a road by any means.

"YANK" DENTON.

Sir,—My claim for a speed of 75 m.p.h. on a  $3\frac{1}{2}$  h.p. Sunbeam in touring trim seems to have caused considerable excitement, particularly in the camp of a rival mount. Why should not a 499 c.c. Sunbeam engine be capable of attaining high speed? Can any of your readers name a more efficient engine, and one in which the manufacturers have paid more attention to induction and exhaust ports, timing gear, etc.? The gear used was 4 to 1, so the revs. were high, but balance accounts for that. The speed was recorded on a Watford speedometer which had just been tested by the makers, and I have enough experience to know the correct gearing for the instrument.

I shall be very pleased to extend my challenge to Mr. Lindsay as well, if he cares to accept it. With regard to aspiration to petty fame, which another correspondent mentioned, I may say, if such were my aim, I should certainly put my name under the claim. Since the outbreak of war, only two  $3\frac{1}{2}$  h.p. machines have been generally considered capable of speed, because they have been advertised largely by their particular enthusiasts in the press, but in the meantime other manufacturers have not been at all idle in the development of the petrol engine. E.K., R.F.C.

### CENTRIFUGAL FORCE

Sir,—There has been a lot of discussion lately about "centrifugal force." The name is very misleading, as it literally means centre flying force. Centrifugal force is not a force acting on a body, but a force exerted by the body. A better name for it would be circumferential force or circumference bearing force. An overhand bowler releases the ball when his hand and arm are perpendicular, and the ball goes in a direction at right angles to his arm. If centrifugal force acted radially, i.e., along his arm, the bowler would have to continue the circular motion of his arm until it reached a horizontal position. If you watch the drops of water from a garden sprinkler, you will see that they leave the revolving arms in a direction at right angles to that in which the arm is pointing.

In order to reduce a difficult dynamical problem to a purely statical one, the body under consideration is taken to be at rest and an entirely fictitious force imagined to act radially outwards on the body to maintain equilibrium. Suppose a cyclist

to be going round a corner. He leans over towards the centre of the circle which he is describing. Let him suddenly be brought to rest. He would fall over towards the centre of the circle unless someone pushing him outwards prevented it.

BA is the rider and machine (the forces acting on him are in the direction of the arrows), W his weight, P the person pushing, F road friction, and R upward thrust of the road.

PF and WR form two couples, which exactly balance each other. If the cyclist did not lean over, WR would be weaker than PF, and he would fall.

A rider travelling in a straight line can be considered to be going round an infinite circle. If centrifugal force acted radially, he would immediately be thrown over, as the force would be acting directly at right angles to his direction; but as centrifugal luckily acts tangentially to the circumference of the circle, it acts along the line of his direction, and is, as a matter of fact, the force which is propelling him. We have come back to the original argument that centrifugal force is produced by the moving body.

I know that I have not even attempted to answer the problem of how a cyclist keeps upright, but I hope that I have added one more fact that might produce a brain wave.

LIEUT. R.F.A.

Welling.

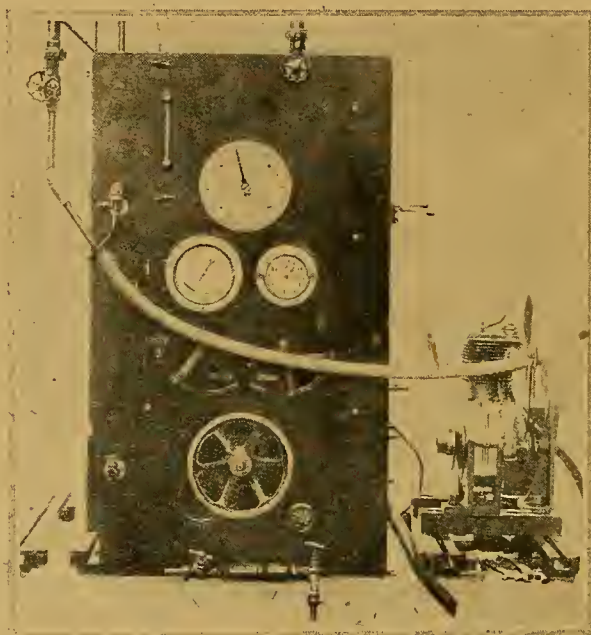


## COAL GAS FOR ENGINE TESTING.

The Bench Tests of J.A.P. Motor Cycle and Light Car Engines.

THE accompanying photograph shows the engine testing bench used in the works of Messrs. J. A. Prestwich and Co., Ltd., Northumberland Park, Tottenham, London, N.17. On it is shown a 4 h.p. motor cycle engine connected up to run on coal gas.

The whole scheme is particularly well worked out, and is so arranged that either a light car engine or motor cycle engine of any size or horse-power can be conveniently tested. On the centre of the board a Salter spring balance is mounted, showing the load on the Froude dynamometer behind it. Beneath it, to the left, is a Tachometer, showing the revolutions per minute, while on the right there is a clock. Below are the throttle and ignition controls for a light car engine, while on the extreme right of the board can be seen the carburetter controls for a motor cycle engine. At the bottom, in the centre, is the wheel by means of which the load on the dynamometer can be varied, while on the left of the board are the oil drip feed and oil connection. To the left of the spring balance is a petrol gauge, behind which is a small tank holding a measured quantity of petrol.



A 4 h.p. J.A.P. engine undergoing the bench test on coal gas.

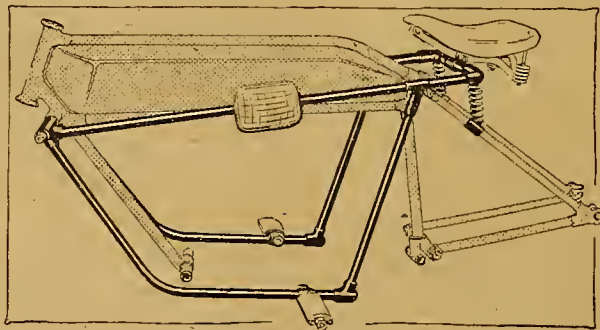
With the aid of the instruments on this board a complete record of the behaviour of an engine can be obtained, *i.e.*, the horse-power under varying conditions, and the average horse-power, petrol, and oil consumptions over a stated time and for a definite quantity of fuel. The figures obtained from an installation of this kind make most interesting reading. Behind the board, and slightly to the left of it, may be seen a large funnel which conducts an air blast on to an air-cooled engine when one is being tested.

Though not very much has been heard of the J.A.P. engine lately in these pages, we may mention that the experimental department of this well-known firm of engine manufacturers has been busily engaged in getting ready for the after-the-war market. We had an opportunity of seeing a long stroke J.A.P. engine fitted to a Matchless combination which showed great promise. One of the most conspicuous features concerning it was its silence in running, not only as regards the exhaust, but it was practically devoid of those objectionable tappet and valve noises which are so frequently encountered in the V-type motor cycle engine.

## SPRING FRAME ATTACHMENT.

A Device adaptable to existing Rigid Frames.

THE spring frame device illustrated on this page has recently been patented by the New Hudson Cycle Co., Ltd. (Patent No. 110,040, October 11th, 1917.) It will be seen that the sprung portion is pivoted to the existing frame at the forward end of the main cross-bar, while at the rear end, adjacent to the saddle, it is attached to the main frame by means of a compression spring. This auxiliary frame supports the saddle, footrests or footboards, and the knee grips, and it will readily be grasped that any motion imparted to the rear wheel of the rigid frame by inequalities of road surface cannot be communicated to the auxiliary



A spring frame which will appeal to owners of rigid frame machines, being adaptable to any existing type.

frame, except through the coil spring. The front end of the auxiliary frame, however, is in no way insulated, and therefore it would be desirable for the footrests to be placed as far back as possible, otherwise the feet of the rider would benefit very little from the springing. As already pointed out, this arrangement stands unique in that it could be adapted without serious structural alterations to existing rigid frame mounts, the attachment being subjected to no serious stresses beyond the weight of the rider, and therefore it could be made of light gauge material. The only structural alteration, therefore, would be some simple brazing.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from question: bearing on technical subjects.

## Removing an Oil Stain.

**?** I should feel obliged if you would let me know the most effective way of removing an undesirable stain on the top of my tank. The oil from the tank has practically ruined the bright colour, and to remove the stain would be a boon.—A.G.R.

Petrol may remove the stain. If, however, you find that it will not, the best plan will be to rub down lightly the top of the tank with fine pumice and paraffin, by means of an old toothbrush.

## Gear Ratio.

**?** I have a 2½ h.p. T.T. model Singer. Would you kindly tell me: (1.) If a gear ratio of 3 to 1 is too high, as it has a fixed engine and single speed, and is used for carrying two people generally? Does this harm the engine? (2.) Would it be possible to connect the acetylene lamp generator to the engine and run it on acetylene gas, or would the explosion be too powerful and burst the cylinder head?—W.T.H.

(1.) A 3 to 1 gear is much too high for ordinary use with a single speed; 5½ to 1 would be far more reasonable. Such a high gear would tend to make the engine knock up hill and against heavy winds. (2.) Yes, but there is always a risk in using acetylene as a fuel, as you might get a broken connecting rod. Also, carbide is practically unobtainable at the present time.

## A Mechanical Knock.

**?** My mount is a 1913 3½ h.p. B.S.A., single-speed, with clutch in hub, gear 5 to 1. The engine runs perfectly in every way, except for a slight knocking, of which I cannot find the cause. I thought it might be due to slight play in the connecting rod bushes, so I had these rebushed and a new gudgeon pin fitted. But without effect. It is not caused by advanced ignition, because if I retard to dead centre the knock continues. The engine has been cleaned out, but that did not improve matters. It is not pre-ignition, because it begins directly the machine is started. I notice it mostly when I am driving against a stiff wind. Would you be so good as to suggest the reason for this trouble?—C.H.L.

The knocking of which you complain may be due to the piston being too loose a fit, to too large a tappet clearance, to noisy timing gear, to the noise of the valves, or to badly worn piston rings.

## Petrol Permit.

**?** My trade having gone down since the war, I sold my horse and trap, as I could not afford to keep the horse, and bought a motor cycle and had a tradesman's sidecar attached. I was able to do all my wholesale trade with it on 10s. a week, whereas it was costing 20s. per week to keep a horse. Now I am properly done, as the authorities will not grant me a petrol licence. I have written to the Petrol Control Committee about a dozen times, and have had the same answer.—K.A.

There is little probability of your being able to get any petrol allowed you for your work, and we very much regret that we cannot help you. If you are a member of one of the motoring associations, you might get into touch with the Secretary and ask him to take up your case with the Petrol Controller.

## IMPORTANT NOTICE.

### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

## Irregular Running.

**?** I should be glad of your opinion of the following mysterious behaviour of my 2½ h.p. J.A.P. engine. (1.) When throttling down on the flat or on slightly down gradients, the engine will develop most erratic running. It will suddenly slow up, and then, without touching the throttle, dart forward again, and so on, until a greater speed has been attained. The most extraordinary part is that, running up hill or pulling hard, there is not the slightest suspicion of erratic running. The trouble becomes worse after the engine gets hot. (2.) The carburetter is clean, the ignition is in order, the plug points are correctly set, and the tappet adjustment is right.—C.R.P.

Probably your trouble is due to the petrol level being too low, and consequent starving of the engine at periods. We think that if you carefully check the petrol so that the carburetter just does not flood, your trouble will disappear.

## A Cracked Piston.

**?** When overhauling my 2½ h.p. Levis recently I discovered a crack of about ¾ in. in the skirt-ir of the piston. At the extremity of the crack I bored a 3/32 in. hole. Do you consider this will stop the crack extending, or would you advise me to replace the piston?—T.J.N.

We think the hole you have drilled will prevent the crack extending, but if you can manage to procure a new piston it would be as well to do so. When you get the new piston, the crack in the old piston may be welded, and then it will be as good as new and handy to keep as a spare.

## Fuel Queries.

**?** I am a premium engineering student. Because of business needs and my health, I want to go to and from the works daily (total distance thirty-four miles) to my home. (1.) Is there much chance of obtaining petrol? If not, could paraffin be used as fuel with a paraffin vaporiser? (2.) Does paraffin come under the Petrol Restriction Order? If so, to whom must I apply for a licence? (3.) Would a two-stroke stand up, or (4.) would a 3½ h.p. twiu or 4 h.p. single be more suitable in the long run? (5.) What is the approximate and respective fuel and lubrication consumption? (6.) Is there any chance of procuring a new machine? If not, would a 1916 model (second-hand) stand up?—W.D.E.

(1.) A petrol licence will be granted only if the machine is being used on essential national work, and provided a letter in support of the application is obtained from the particular Government Department concerned. (2.) Paraffin comes under the same regulations as petrol, and is counted as a petrol substitute by the Board of Trade. (3.) A two-stroke would prove a perfectly satisfactory machine, but, of course (4.), a higher powered mount would naturally be faster on a long run, and would stand more wear and tear. (5.) In the case of a 3½ or 4 h.p. machine you should do about 60 to 80 miles per gallon of petrol, and the same distance per half-pint of oil. In the case of a 3½ or 4 h.p. machine you should do about 80 to 100 miles per gallon of petrol and 100 miles per pint of oil. (6.) You can obtain a new machine only against a Ministry of Munitions priority certificate. A second-hand model, however, should give you every satisfaction, and should be quite reliable in service.



### Piston Ring Joints in Line.

**[?]** (1.) Will you please suggest a remedy for piston rings creeping? The rings are new and have ordinary cross cut joints. After running a few minutes the joints move round until close together, thus causing loss of compression. I have changed the position of the rings so that the joints are opposite each other, but I am unable to find a remedy. (2.) I have packed the leaking crank case joints with greaseproof paper, with and without gold size, also brown paper and seccotine, but the leakage of oil continues.—A.O.

(1.) The only remedy would be to pin the rings. (2.) Possibly the surfaces are not true and clean. If they are, and a brown paper washer is fitted, there should be no leakage. You might also try painting the joint with fish glue.

### Coal Gas Difficulty.

**[?]** Seeing in *The Motor Cycle* some notes on using gas for motor cars, I thought you would be able to give me some information on the following: Some time ago I bought an F.N. motor cycle engine, with the intention of converting it into a gas engine (stationary). I chipped the ribs of the cylinder and fitted a water jacket to it. The engine has mechanical inlet valve enclosed in a pipe. I closed up the open end of pipe and bored a couple of 3/16 in. holes, one for the gas supply, the other for the air supply. I was advised to fit a long pipe about 5ft. for the air supply. The spring of inlet valve is just strong enough to keep the valve closed. The exhaust valve begins to open on the beginning of up stroke and closes when the piston is on the top of stroke. I fitted an ignition tube and chimney, and have tried the engine several times, but cannot get it to go. The tube gets red hot and there is a good supply of gas. The compression seems good, as it is very hard to turn the wheel on the compression stroke. I fitted a flywheel in place of the small belt wheel that was on engine. The engine is in good condition and shows no signs of wear. I should be greatly obliged if you could give me any idea as to why the engine will not go. I have a fairly good sized gasbag connected to the supply pipe.—J.J.

In all probability the reason why your engine will not run is because you are giving it much too rich a mixture, your gas feed pipe and your air hole being the same size, whereas you should admit about seven times as much air as gas. Therefore drill six more holes in the induction pipe of the same bore as the gas pipe. Evidently you were advised to fit a long air pipe in order to eliminate wastage of coal gas by blow back; and if you find this occurs you might fit a large tin muffler at the end of the air pipe, with air holes drilled on its underside only. This would catch the blow back and act as a reservoir. We think this would be preferable to a long pipe, which would offer considerable resistance. You will require a throttle valve between the mixing point and the engine. Your valve can give a very short dwell, but is all right for stationary work.

### Undoing a Brazed Joint.

**[?]** I want to fit a new tube to my motor bicycle frame, but find I cannot unbrazed the old tube from the lugs, although I have drilled out the pegs. I should be glad if you would tell me the correct method of doing this. I have done a fair amount of brazing (large and small work), but have never removed a tube joint before.—F.Y.

Heat the lug and hammer it with a wooden mallet; or if you cannot get it out in this way, cut the lug off short, get your new tube, and then fit a liner and braze in. The joint should be very carefully cleaned.

### Charging Accumulators from Main Lighting Circuit.

**[?]** Can I charge my accumulators from ordinary service 240 volts? The accumulator is a Hart 4 volt 20 ampère hours, and is marked charge at 2.5 ampères. I have been told that it is a simple matter when one has direct current, which I have.—F.W.D.

There is no difficulty whatever in charging the accumulator from the ordinary lighting circuit, provided that this is of the direct current type. The accumulator should be wired in series, with one or more bulbs that are burning. The ampère of the bulb is generally marked on it, and if the ampère is, say, .5 amp., the current passing through the accumulator wired in series with one bulb will be .5 amp. With five bulbs the current will be 2.5 amps. Charging will be quite satisfactory at the rate of .5 amp., but, of course, will take just five times as long as if the charging rate is 2.5 amps. If the bulbs have no ampères marked on them, this may be found by dividing the candle-power of the bulb by the voltage of the circuit. Thus, a 100 c.p. bulb in a 240 volt circuit has an ampère of approximately .4.

### Coal Gas.

**[?]** (1.) About what capacity would a bag 2ft. square contain, and what would be the maximum mileage obtainable from such a one for a 3½ h.p. solo machine? (2.) Where would the connection with the B. and B. semi-automatic carburettor be made? (3.) What size of hole must it be? I suppose a brass tube let in and a rubber tube pushed over would do as well?—W.H.L.

(1.) A bag "2ft. square" might be of any length. It can be taken that a 3½ h.p. machine will require approximately 3 cubic feet of coal gas per mile. (2.) Your best plan would be to fix a pipe extension, of about 8in. in length, to your carburettor air intake, and lead the small pipe from your gasbag into this extension, so that it terminates close up to the carburettor. Leave the end of the extension pipe open, of course, so as to obtain the necessary quantity of air. (3.) The gas pipe should be about one-seventh the bore of the extension pipe, so as to feed approximately a 12-14% mixture, according to the quality of the gas. By this arrangement the engine will draw in an approximately correct mixture at all throttle openings, and the engine will be controlled simply by restricting or opening up the induction by the existing throttle lever.

### READER'S REPLY.

#### Hub Gear Adjustment.

A friend of mine bought a 3½ h.p. New Hudson combination, three-speed Armstrong hub gear (for 6 h.p. bicycle). This gear would not work in low speed—in fact, it would not engage. The top and middle speeds worked perfectly. The previous owner had sent the gear away to be overhauled, and the firm (probably the same firm as "P.A.W.") sent his to put new parts in it and sent it back, and, as in "P.A.W.'s," it would not work in low speed. He could not get it to work in low at all, and as he usually drove without a passenger, the middle and top did all right. My friend lost his left leg on the 1st July, 1916, in France, and has only an inch and a half of stump left, so therefore he needed low gear for starting from a standstill with a passenger. He never rode a motor cycle before, and now he can manage it as well as I can, and he has only had it about three months. We took the hub out, and found the pinions, gear wheels, etc., in perfect order and not worn, but the low gear pinion was not moved far enough to engage or mesh with the others. We took the gears to pieces, and found that the sliding keys which push the low gear pinion into mesh appeared to be too short. Then we made a washer to fit up against the end of these sliding keys and between the keys and the pinion wheel. We then assembled the gear, and found it worked perfectly in all speeds on the road with a load, and has worked perfectly in all three speeds since.

If "P.A.W." adjusts his gear control rod as tightly as he can, and the movement of the lever on low gear is taken up by the spring on the control rod, he may be sure his trouble is the same as we experienced, and any intelligent mechanic should be able to put it right in about four hours' time. I think that there should have been a washer between the sliding keys or feathers which push the low gear into mesh and the gear pinion, and that this had been omitted by the firm. When fitting the washer "P.A.W." must be sure it is not too thick or too thin, and that it just fits freely on the spindle and does not have a larger diameter than that of the sliding feathers; these he will be able to correct by partly assembling the gear and testing it by pushing the low gear in with the push rod.—J.W.

### RECOMMENDED ROUTES.

#### SOUTHAMPTON TO BLACKBURN.—J.H.

Southampton, Winchester, Whitechurch, Newbury, East Ilsley, Abingdon, Oxford, Woodstock, Chipping Norton, Moreton-in-the-Marsh, Evesham, Worcester, Kidderminster, Bridgnorth, Wellington, Hodnet, Whitechurch, Tarporley, Warrington, Newton-le-Willows, Wigan, Chorley, Blackburn.

#### STOURBRIDGE TO CHINGFORD.—A.T.

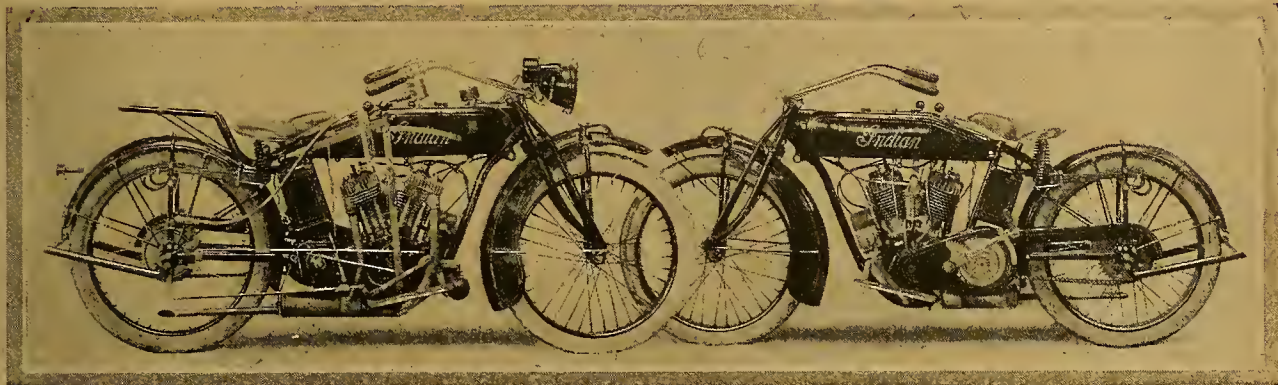
Stourbridge, Bromsgrove, Headless Cross, Alcester, Stratford-on-Avon, Banbury, Aynho, Bicester, Aylesbury, Tring, Boxmoor, St. Albans, Hatfield, Potter's Bar, Enfield, Ponders End, Chingford. Approximately 135 miles.



1918  
Powerplus

# Indian

Motocycles



Which we trust will be Post-War Models.

We regret that we are not in a position to supply motorcycles or send out catalogues at the present time, but when we are able to do so we will freely advertise the fact. This applies to Great Britain only.



**HENDEE MANUFACTURING CO.,**

"Indian House," 366-368, Euston Road, London, N.W.

Telephone: Museum 1643.

Telegrams: "Indian, Eus-road, London."

AUSTRALIA, 109-113, Russell St., Melbourne.

CANADIAN WORKS, 12-14, Mercer St., Toronto.

AFRICA, Indian House, 127-9, Commissioner

Street, Johannesburg.

Indian House, 579, West Street, Durban.

Indian House, Strand Street, Port Elizabeth.

**Bowden  
Wire Ltd.  
London**

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

Victoria Road, Willesden Junction, N.W.10.  
Established 1897.

## SIMMS

**"Non-Soot" Plug.**

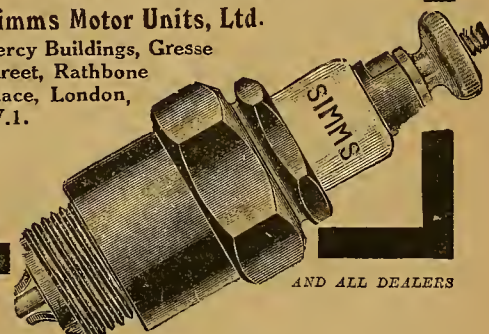
*The importance of cool contacts.*

Special attention has been given to the central electrode of Simms "Non-Soot" Plug. This has been designed with the object of conducting the heat away from the tips; the result being a plug, the contacts of which do not attain a temperature which can cause pre-ignition.

PRICE, SINGLE OR TWIN  
POINTS, AMER. OR  
METRIC THREAD, 3/6

**Simms Motor Units, Ltd.**

Percy Buildings, Gresse  
Street, Rathbone  
Place, London,  
W.1.



AND ALL DEALERS

In answering these advertisements it is desirable to mention "The Motor Cycle."



# MISCELLANEOUS ADVERTISEMENTS.

## PRICES.

**ADVERTISEMENTS** in these columns—First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to **ILIFFE & SONS Ltd., and crossed**

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

## NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

## DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

## SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

## MOTOR CYCLES FOR SALE.

### Abingdon.

**ABINGDON** King Dick, 6h.p., 1915, countershaft 3-speed in exceedingly good condition, all accessories, with or without C.B. sidecar; very reasonable price.—Laytons' Garage, Bicester. [2144]

### A.J.S.

**A.J.S.**, new Military Model, 1917; £90/6.—Turpins, 29, Preston Rd., Brighton. [2035]

**A.J.S.** Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [9688]

**LATEST** War Model A.J.S. Combination in stock; £111/12; solo, £91/6.—Cross, Agent, Rotherham. [X9478]

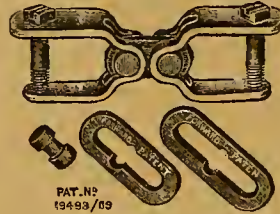
**A.J.S.** 6h.p., 1914 Combination, splendid condition; £52/10.—Davis, 166, Purves Rd., Kensal Rise, N.W. [2072]

**A.J.S.**, 6h.p., and sidecar, one of the last 1915 models turned out; price only 75 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [0931]

**A.J.S.**, 2-speed, clutch, and K.S., aluminium footboards; £37/15; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9687]

**1916** 6h.p. A.J.S. Combination, spare wheel, lamps, chain, in perfect order; £85; prompt cash.—Lieutenant, Clarence Hotel, Darlington. [X9590]

**A.J.S.**, 2½h.p., 1915, 3 speeds, kick start, hand clutch, indistinguishable from new; £45, post £65.—Ranting's Motor Exchange, Masons Av., Harrow. [2181]



The Forward, 1/6.

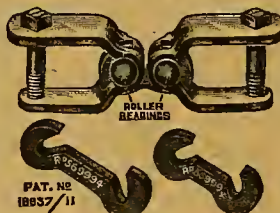
Faith in the fastener can only be justified by experience of its reliability.

# FORWARD

fasteners are made with extra strong steel links and roller bearings, which ensure long wear and unflinching service under all circumstances.

Ask us about their construction. ::

**FORWARD MOTOR CO.,**  
35, Forward Works, Summer Row,  
**BIRMINGHAM.**



The King Hook.

Detachable, 1/-; Adjustable, 1/3

# DIXIE

**American Supplies Co. Ltd.**  
162 Grt. Portland St. London W.1

# Photography

Every Wednesday Twopence.

## IMPORTANT NOTICE.

Owing to the Christmas Holidays, the issue of "The Motor Cycle" for Dec. 20th must be closed for press earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, Dec. 13th.

## DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

## MOTOR CYCLES FOR SALE.

### A.J.S.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1916 De Luxa A.J.S., 6h.p., coach sidecar, spare wheel, hood, screen; 95 gns. (D) [2200]

**A.J.S.** Motor Cycles; immediate delivery of special 1917 model, complete, detachable wheels, 700x80 tyres; £91/6.—P. J. Evans, 87-91, John Bright St., Sole agent for Birmingham and district. [X8686]

**A.J.S.**, 1916 model, dry cell lighting, two C.B. bodies, one business model, 700mm. tyres, two new, absolutely reliable; £80 cash; might consider cycle car.—Smith, 1, Greenhill Garden, Salsbury, Sutton. [2119]

**A.J.S.** Combination, late 1914, 6h.p., 3 speeds, kick start, detachable wheels, all accessories, coachbuilt sidecar, cover and hood, new condition, run 3,000 miles; £70, or near offer.—Bernard, Penrhyn, Tillington, Stafford. [X9654]

### Alldays.

**ALON**, 2-speed, £29/10; also all new models: E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9689]

**ALON**, 1917, 2½h.p., 2-stroke, 2 speeds; £40; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2170]

**ALON**, 1916, 2½h.p., 2-stroke, excellent condition; £30; deferred payments accepted.—Eastern Garage, 418, Romford Rd., Forest Gate, E.7. [2169]

**ALON**, 1915, 2½h.p., 2-stroke, excellent condition; £25; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2168]

**ALLDAYS** Alton 1917 2-stroke Motor Cycle, countershaft, chain and belt drive, nearly a new machine; absolute bargain for quick sale, £26/10.—3, The Mews, Victoria Rd., Clapham. [2069]

**ALON** (new), 2½h.p., 2-stroke, all models in stock for immediate delivery; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Dept., 118, Brompton Rd., London, S.W.1. [2186]

### Ariel.

**CROW Bros.**, Guildford.—Ariel, latest 3½h.p., 3-speed countershaft models in stock. [1048]

**ARIEL**, 5-6h.p., 3-speed and clutch, C.B. sidecar, hood, screen, Lucas lamps, Cowey speedometer; £66; E.P. or exchange; all new models supplied.—Service Co., 292, High Holborn, W.C.1. [X9684]

**ARIEL** (new), 3½h.p., 3-speed countershaft gear, clutch, and kick-starter, decompressor, patent spring seat pillar; £72; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Dept., 118, Brompton Rd., London, S.W.1. [2187]



## MOTOR CYCLES FOR SALE.

## Ariel.

**ARIEL**, 3½ h.p., 3-speed countershaft gear, clutch, and kick starter, decompressor, patent spring seat-pillar, and coachbuilt sidecar; bargain, £38/10, or near offer.—Coneybeare, 1, Commerell St., East Greenwich. [2033]

## Auto-Wheels.

**AUTO-WHEELS**.—Wall, complete, £7; another, De Luxe, £7/10.—Gittins, Ltd., Oswestry. [1784]

**AUTO-WHEEL** and Royal Sunbeam all-weather cycle, in excellent condition; £17/10, or exchange for Douglas with cash; seen Saturday or Sunday.—Webb, 2, Sylvan Rd., Forest Gate, E.7. [2142]

## Bat.

**BAT-J.A.P.**, 1915, 2 speeds, engine No. 52,262, perfect, like new, very fast; £46.—Styles, Becking, Braintree. [2050]

**BAT**, 3½ h.p., B. and B., C.A.N., new tyres and belt, adjustable pulley, low frame; £12.—Box 1,512, c/o The Motor Cycle. [X9713]

## Bradbury.

**BRADBURY** 4 h.p., 3-speed; £25; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9700]

**3 h.p.** Bradbury, Simms-Bosch, B. and B., nearly new tyres and belt; £12; exchanges considered.—Hanson, Rehoboth, Spring Terrace, Rawtenstall. [X9653]

**1914 6 h.p.** Bradbury Combination, countershaft 3-speed, chain drive, kick starter, Bosch lighting, Bradbury coachbuilt Model de Luxe sidecar, Easting wind screen, lamps, and horn, completely overhauled, appearance as new; £50.—The Premier Motor Co., Aston Rd., Birmingham. [2121]

## Brough.

**BROUGH**, 1916, horizontal twin, 3½ h.p., Sturmay C.S. gear box; £55, or exchange for Grand Prix Morgan with cash.—Bailey, 35, Stanhope Rd., Northampton. [X9605]

## Brown.

**BROWN**, 3½ h.p., newly overhauled, in good condition; £9.—Moore, 40, Catherine St., Eland, Yorks. [X9647]

## B.S.A.

**B.S.A.** New Models H. and K. actually in stock.—Moss, Wey. [X9641]

**B.S.A.** Combination, 1914-5, countershaft 3-speed, new condition; 42 gns.—Kington, 223b, Hammersmith Rd., London, W. [2071]

**1916 B.S.A.** Model K, coachbuilt sidecar, lamps, horn, all accessories; 56 gns.—Briggs, Motors, Wellingborough. [X9667]

**B.S.A.**, 3½ h.p., N.S.U. 2-speed, free engine back wheel, good condition; £18.—Briggs, Motors, Wellingborough. [X9671]

**B.S.A.**, 4½ h.p., Model K, new August, 1916, lamps and accessories; £56, no offers.—Wilson, Jesmondale, Lostock Gralam, Cheshire. [2150]

**1917 (May) B.S.A.**, Model H, coach sidecar, well equipped; £72; appointment.—Burshaw, 129, Wimbleton Park Rd., Southfields, S.W.18. [2070]

**B.S.A.**, 1915, chain drive, speedometer, lamps, horn, B.S.A. coachbuilt sidecar, good condition; £54.—Blacklock, Holmstead, Weston Rd., Guildford. [2148]

**B.S.A.**, 4½ h.p., 3-speed countershaft, late 1916, and Bramble sidecar, new condition, suit tradesman; bargain, £60.—9, Spring Hill, Erdington, Birmingham. [X9569]

**B.S.A.**, 1914, 4½ h.p., Model K, 3 speeds, clutch, and kick starter; £40; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2173]

**4 h.p.** B.S.A., and No. 2 sidecar, chain-cum-belt, late 1915, in perfect order, 3-speed, equal to new, Palmer tyres; sacrifice £70, or nearest.—Owen, Epworth, Doncaster. [X9649]

**B.S.A.**, 1916, 4½ h.p., 3-speed, chain-cum-belt, and Meade and Denkiu sidecar, lamp, horn, luggage grid, and accessories, 2 spare covers and one tube; £65.—Rev. J. Tuckey, Ennisken, Co. Cork. (D) [X9651]

**B.S.A.** 1916 4½ h.p. Coachbuilt Combination, countershaft 3 speeds, clutch, kick start, chain-cum-belt, lamps, horn, etc., absolutely perfect throughout; £55/10.—Page Bros., 162, Acre Lane, Brixton, S.W. [2068]

**1916 B.S.A.**, 4½ h.p., chain-cum-belt, 3-speed combination, wind screen, lamps, mechanical horn, speedometer, kit of tools and spares, etc.; 60 gns.; London area.—Box L5,233, c/o The Motor Cycle. [2192]

**1915 B.S.A.**, 3-speed countershaft, all chain drive, run under 2,000, the property of an officer in France; what offers? Seen in London any time by appointment.—Box L5,190, c/o The Motor Cycle. [1967]

**B.S.A.**, 1917, 4½ h.p., 3 speeds, clutch, and kick starter, lamps, and horn, and sidecar with wind screen, luggage carrier, etc.; £75; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2174]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1916 B.S.A., 4½ h.p., 3-speed countershaft, chain-cum-belt, coach sidecar, 59 gns.; ditto, all chain drive, 62 gns.; 1915 B.S.A., all chain coachbuilt combination, hood, screen, 49 gns.; 1913 B.S.A., 2-speed, 27 gns. (D) [2202]

## BARGAINS

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## IT WILL PAY

you to scan this list, and, even if you are not one of the favoured owners of a petrol licence, it would be profitable to purchase some of these bargains for storage until the return to happier times.

We shall be pleased to reserve any machine, against a nominal deposit, for any reasonable time if required, and gladly give fullest particulars upon request.

## SIDECAR COMBINATIONS.

**ZENITH**, 1917, 4-5 h.p., Model C, 2 lamps, Lucas horn, and brand new Phoenix sporting Sidecar. Not done 500 miles ..... £54

**CLYNO**, 1916, 6 h.p., 3-speed Combination, detachable wheels and spare, all lamps, mechanical horn, and Watford speedometer, military khaki finish .... £80

**A.J.S.**, 1914, 6 h.p., 3-speed Combination, electric lighting, Klaxon horn, coachbuilt Sidecar, with hood

**DOUGLAS**, 1915, 4 h.p., 3-speed, kick-start and clutch, C.B. Sidecar and windscreen, head and tail lamps, Watford speedometer, great bargain ..... £60

**CLYNO**, 1914, 6 h.p., 3-speed, kick-start, detachable wheels and spare, just been completely overhauled

**A.J.S.**, 1914, 6 h.p., 3-speed and kick-start, Miller lamps, coachbuilt Sidecar with hood and windscreen; a great bargain ..... £53

**NORTON**, 1914-1915, 3½ h.p., 3-speed S.A. countershaft gear, all lamps, Canoelet coachbuilt Sidecar

**EXCELSIOR**, 1915, 8 h.p., 3-speed, dynamo lighting, complete with wicker Sidecar; requires slight adjustments ..... £47

## LIGHT CARS, ETC.

**SWIFT**, 1915 model, 10 h.p., 5 wheels, dynamo lighting, Palmer cord tyres almost new all round, finished dark green, clock, and speedometer .... £219

**MORRIS-OXFORD**, 1914, special 10 h.p. model, sporting body, speedometer, rev. counter, Zephyr pistons, 20 gall. tank, just being overhauled ..... £200

**BUCKINGHAM**, 1914, 10 h.p., V engine 90°, water cooled, disc wheels, requires repainting ..... Offers.

## MOTOR CYCLES.

**BAT**, 1914, 6 h.p., T.T. model, c-shaft, 3-sp., French grey finish, torpedo tank, disc wheels, all access.

**RUDGE**, 3½ h.p., fixed gear, good tyres, 2 lamps, Jones' speedometer; condition as new ..... £24

**DOUGLAS**, 1914, 2½ h.p., 2-speed, Bosch magneto, head and tail lamps, Dunlop tyres ..... £33

**SCOTT**, 1914, 3½ h.p., 1914 twin, w-c., 2-speed Lucas lamp, Stewart speedometer; requires slight attention. A great bargain ..... £36

**RUDGE**, 1913, 3½ h.p. Multi, Palmer cord tyre, Sen-spray carburettor. A very fast machine ..... £26

**ENFIELD**, 2½ h.p. twin, chain-driven model, Grado gear; adjustment only required. Bargain ..... £19

**LUGTON**, 3½ h.p., Triumph type, Precision engine, B. & B. carburettor, Saxon forks ..... £20

**REX**, 1913, 3½ h.p., 2-speed, handle-start, spring forks, Bosch magneto. Cheap ..... £18

**RUDGE**, 3½ h.p., fixed gear, B. & B. carburettor, horn and lamp, excellent condition ..... £18

**CALTHORPE**, 1915, 2-speed, 2-stroke, Dixie magneto, adjusted to run on paraffin ..... £20

## SPARE PARTS.

We are dismantling:  
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and can still offer many parts thereof (on approval) at 50% on makers' usual and current spare parts lists.

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## MOTOR CYCLES FOR SALE.

## Calcott

**1912 Calcott**, 2½ h.p., single speed; £12.—Briggs, Motors, Wellingborough. [X9672]

## Calthorpe.

**CALTHORPE**, 1915, 2½ h.p., 2-stroke, 2 speeds, lamps, and horn; £27; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2171]

**CALTHORPE-J.A.P.**, 1916 model, thoroughly overhauled, 2½ h.p., Enfield gear, tyres in excellent condition; £28, or best offer.—W. D. Gibbs, Hammetton Rd., Bromley, Kent. [X9609]

## Campion.

**1915 Campion-Jap**, 2½ h.p., 2 speeds, free engine, Lucas lighting set, beautiful order; £26.—Holmes, Birchwood, South Normanton, Derbyshire. [X9640]

## Chater-Lea.

**CHATER-LEA** 8 h.p. Combination for sale, in magnificent running order, advertised recently £47, will accept £43, war bargain.—Apply, Leathwood's Garage, opposite Selhurst Post Office, near Croydon. [2190]

**CHATER-LEA** 5 h.p. Combination, 2-speed, free engine, Bosch mag., all new tyres and tubes, new coachbuilt sidecar, only done 50 miles, new Dunlop belt, new set Powell and Hammer lamps, B. and B. carburettor, ready to ride away; £40.—Hunt, 10, Nelson's Row, Clapham. [2036]

## Clyno.

**CLYNO** 1913-14 Combination, 5-6 h.p., 3-speed, spare wheel, lamp set, Covey speedometer, horn, etc., price £59/10; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9697]

**CLYNO** Combination, 1914, 6 h.p., hood, screen, detachable wheels and spare wheel complete, lamps, horn, and speedometer; £62; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2180]

**CLYNO** Combination, 6 h.p., 1914, coachbuilt sidecar, 3-speed countershaft, kick start, interchangeable spare wheel, speedometer, lamps, etc., two brand new 31in. tyres, fine condition; £55.—Hillyard, 16, St. John's Villas, Friern Barnet Rd., New Southgate. [2083]

## Coventry Eagle.

**COVENTRY** Eagle, 2½ h.p. Villiers 2-stroke engine, 2-speed countershaft gear, Brampton forks, Dunlop non-skid tyres; £42; offered on behalf of owner; absolutely unused.—Harrods, Motor Dept., 118, Brompton Road, London, S.W.1. [2189]

## Douglas.

**1914 Douglas**, complete, lamps, etc.; £33.—Cross, Jewell, Rotherham. [X9479]

**I CAN** Supply You with a 1917 Douglas.—J. Gourlay, Fallowfield, Manchester. [9858]

**DOUGLAS**.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

**DOUGLAS**, 1914, 2½ h.p., 2-speed Model U, £27.—Thompson, 408 Commercial Rd., Portsmouth. [X9710a]

**DOUGLAS**, 1914, 2-speed, magnificent condition; 32 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [0927]

**DOUGLAS**, 1914, 1915, many other machines, overhauled ready for use.—Griffins, 89, Gt. Portland St., W.1. [1806]

**1916 Douglas**, Colonial, 3-speed, clutch, K.S., beauty; bill shown; £40, lowest.—Box 1,511, c/o The Motor Cycle. [X9629]

**DOUGLAS**; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

**4 h.p.** Douglas, 1915-16, 3-speed, K.S., P. and H., semi T.T., splendid condition; £48, with Canoelet £58.—Carey, Egham, Surrey. [2029]

**DOUGLAS**, 1911, 2-speed, clutch, starter, excellent condition—£16, a gift.—R. A. Matthews, Culverdene, Tower Rd., Worthing. [2103]

**1915 Douglas**, 2½ h.p., Colonial Model, 3-speed, new condition, with new spare steel-studded tyre; first 245 secures.—26, George St., Hove. [2105]

**DOUGLAS**, 2½ h.p., 2-speed, 1913, splendid condition, Claudel, speedometer, lamps, spares; £33.—98, Gellatly Rd., New Cross, S.E. [2139]

**DOUGLAS**, 1914, 2½ h.p., 2 speeds, splendid condition, electric light and few spares; £35, or near offer.—Morganti, 18, Wood Mews, Park Lane. [1878]

**1915 Douglas** W.O. Model, only done 800 miles, lamp set, speedometer, condition like new; bargain, £40.—21, Glenshaw Mansions, Brixton Rd. [2113]

**1915 2½ h.p.** Douglas, 2-speed, complete with lamps, horn, speedometer, spares, first-class running order; £45, or offer.—Ingle, Engineer, Ripley, Derby. [X9573]

**DOUGLAS**, late 1913, 2½ h.p., 2-speed, recently overhauled, perfect running order; seen and tested by appointment; £30.—Box L5,220, c/o The Motor Cycle. [2032]

**DOUGLAS** Motor Cycles.—We can deliver 1917 Model W or receipt of permit.—Eli Clark, the Bristol Douglas agent, 223, Cheltenham Rd., Bristol. (Wholesale and retail.) [0923]



## MOTOR CYCLES FOR SALE.

## Douglas.

**DOUGLAS**, 2½ h.p., 1914, complete with all accessories, very powerful, and in excellent condition; £30.—Capt. Kellar, 34, Welbeck Av., Southampton.

**DOUGLAS**, 1913, 2-speed, Bosch mag., £35/10; 1911 2½ h.p., with lamp and tools, £16/10; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1.

**DOUGLAS** 1917 Model V., 2½ h.p., 3-speed, Lucas lamps, horn, accessories, perfect condition, bought July, little used; £52.—Varma, Infirmary, Southport.

**DOUGLAS**, late 1915, 2½ h.p., 3-speed T.T. Model, recently overhauled, accessories; £40, or offer; seen by appointment.—Levet, 16, Old Park Av., Balham, S.W.

**DOUGLAS**, 1911-12, 2½ h.p., 2-speed, engine lately thoroughly overhauled, new parts fitted, new back tyre, splendid order throughout; £18/10.—Box L5,232, c/o The Motor Cycle.

**DOUGLAS**, 1910-11, single-speed, good tyres, running order; £14, or exchange with cash for a good make 2-speed, Lewis preferred.—H. Ballord, 11, Cottage Place, Sloane St., London, S.W.1.

**1915** 2½ h.p. Douglas, T.T., 2-speed, free engine, just been overhauled, enamel and plate as new, guaranteed perfect; bargain, 40 gns.—The Welthoy Motor Garage, Woodford Rd., Forest Gate.

**DOUGLAS**, 2½ h.p., 1915 Colonial Model, 2 speeds, electric lighting, good tyres, in good condition throughout, fully equipped; £45.—Mebes and Mebes, 154-6, Gt. Portland St., London, W.1.

**DOUGLAS**, 1912, £19/10; 1913, £31/10; 1915, £45; prompt delivery of any 1917 models to doctors, farmers, etc., against Ministry of Munitions permit. Motor Exchange, Horton St., Halifax.

**LATE** 1913 Douglas, tank enamelled red, very sporty appearance, just been thoroughly overhauled, splendid condition throughout, only wants seeing; would take gent's first-class cycle part; £32.—Lindfield, High St., Crawley, Phone: 65.

**DOUGLAS**, 2½ h.p., 1912, 2-speed, adjustable pulley, semi T.T. bars, overhauled by Douglas April, 1916, new pistons, connecting rods, valves, crankshaft, timing gear, flywheel, frame new from Douglas August, 1916, gear box new May, 1917, 2½ heavy Kempshalls, £4 worth of spares, accessories; any trial; £25; fuel for 500 miles free.—Box 1,513, c/o The Motor Cycle.

**1917** 2½ h.p. Douglas, Model W., hand-controlled clutch, kick start, latest improvements, £54, plus 20%; also Models U and V, 1916 specification, £50, plus 10%; absolutely new; immediate delivery against priority permits for doctors, farmers, war and munition workers.—How and where to apply for full particulars, write the Douglas Specialists, Robinson's Garage, Green St., Cambridge.

## Edmund.

**EDMUNDS** (new), 2½ h.p. J.A.P., Royal Enfield 2-speed, spring frame, double tank, strongly built machine; £54/12/6; carriage paid to any railway station in Great Britain; extended payments if desired.—Harrods, Motor Dept., 118, Brompton Rd., London, S.W.1.

## Enfield.

**PALMER'S** Garage, Tooting.—3 h.p. Royal Enfield, 2 speeds, low light, handy, economical; £30. [2216]

**2½** h.p. 2-speed 2-stroke Enfield, 1916, perfect condition; £24.—Hutcher, 46, Holmes Rd., Twickenham. [2095]

**ENFIELD**, 3 h.p. twin, 1916 model, practically equal to new; 39 gns.—Julians, 84, Broad St., Reading. Phone: 1024. [0928]

**ENFIELD**, late 1915, 3 h.p. twin, and lightweight C.B. sidecar; £45; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9688]

**ENFIELD** Combination, 6 h.p., grand condition, 3 lamps, 2 horns, screen, and spares; £65, bargain.—Hellen, Boot Maker, Coniston, Lancs. [X9616]

**ENFIELD** Combination, 6 h.p., 1913, new Dunlop tyres, 1915 sidecar body, condition perfect; £38.—Henry, 32, The Broadway, Twickenham. [2074]

**ROYAL** Enfield, 1917, 3 h.p., lamps, horn, and speedometer (as new); £50; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2165]

**1916** Enfield Combination, condition as new, speedometer, 3 lamps, spare tube, spare tyre, and all spares; best offer over £60.—22, High St., Old Brompton, Kent. [X9714]

**ROYAL** Enfield Combination, 1916, 6 h.p., lamps, horn, and speedometer; £78; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2166]

**ENFIELD** 6 h.p. Combination, purchased new May, 1917, complete with all accessories, and as new, actual mileage less than 1,000; reasonable price accepted.—Tollady, Hemmingford, Bicester. [2145]

**ENFIELD** 1916 Combination, 6 h.p., Lucas dynamo lighting, electric horn, inspection lamp, Gloria phone mechanical horn, hood, screen, speedometer, mirror, luggage grid, sidecar step, fully equipped for coal gas, large container carried above machine and sidecar, approximately 18 miles to one fill, beautiful condition; good reason for sale; £120.—Harrison, West Hill, Stalybridge. [2066]

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**1917 MATCHLESS** Combination, 8B, M.A.G. engine, spare wheel and tyre; as new, only ridden 3 times ..... £120

**1916 HARLEY-DAVIDSON** Combination, 7-9 h.p., electric model ..... £85

**1916 SUNBEAM** Combination, 8 h.p., Lucas lighting set, speedometer, horn, mudshields, screen, spare petrol tank, interchangeable wheels, splendid condition .. £115

**1916 Powerplus INDIAN** Combination, spring frame, dynamo lighting, T.T. bars, unscratched ..... £85

**1915 INDIAN**, 5 h.p., and Swan torpedo Sidecar, lamps, horn, speedometer, finished throughout yellow ..... £45

**1914 MATCHLESS** Combination, 8 h.p., M.A.G., lamps, horn, speedometer, luggage grid, just been thoroughly overhauled ..... £68

**1916 B.S.A.**, 4½ h.p., chain-cum-belt, and Millford Sidecar, lamps, horn, etc. .... £65

**1915 HAZLEWOOD** Combination, 5-6 h.p., J.A.P. engine, 3-speed, clutch and kickstart, lamps, and horn; good condition £40

Any of the above can be converted to run on coal gas.

### SOLO MACHINES.

**1917 ZENITH** Gradua, 4-5 h.p., clutch, kickstart, as new, only ridden a few miles .. £73

**1917 ROVER**, 3½ h.p., T.T., Philipson pulley, lamps, horn, as new ..... £50

**1917 NEW IMPERIAL-J.A.P.**, 2½ h.p., 2-speed, clutch, kickstart, T.T. bars, as new, bargain ..... £30

15-16, Bishopsgate Avenue, Camomile Street, E.C.3.

'Grams: 'Elcemocycce, London.'

'Phone: Avenue 5548.

## MOTOR CYCLES FOR SALE.

## Enfield.

**ENFIELD** Combination, 6 h.p., November, 1915, hood, screen, 3 lamps, speedometer, horn, and quantity of tools, mileage just over 2,500, new condition; £75, or near offer.—38, Broadway, Deptford, S.E.8. [2053]

**ROYAL** Enfield Combination, 1916, 6 h.p., dynamo lighting model, 2-seater sidecar, 2 wind screen and hood, numerous accessories; £105; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2167]

## Excelsior.

**1915** Twin Excelsior, 7-9 h.p., run about 4,000 miles, in good condition; £30, or near offer.—Lieut., D. C. Johnston, Scottish Rifles, May's Hill, Worplesdon, Surrey. [2075]

## F.N.

**F.N.**, late 1912, 2½ h.p., free engine, 2-speed, run on paraffin; £15.—Waters, 14, Norwood Av., Didsbury, Manchester. [2132]

## Harley-Davidson.

**HARLEY-DAVIDSON**, 1915, electric model, hardly soiled; £60.—34, Ashvale Rd., Tooting, S.W. [2100]

**7-9 h.p.** Harley-Davidson Combination, in new condition; £75.—Beaumont, 59, Halstead Rd., Enfield. [2025]

**HARLEY-DAVIDSON** Twin, late 1915, and Mills sidecar, in good condition; £60.—Amos Tatham, 56, High Pavement, Nottingham. [X9608]

**1915** Harley-Davidson, with sidecar, electrically equipped, splendid condition; bargain, price £55; must sell immediately.—H. Smith, 3, Long Acre, W.C.2. [2034]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1917 Harley-Davidson dynamo lighting combination, child's seat in sidecar; 125 gns. (1) [2203]

**HARLEY-DAVIDSON** Combination, 1916, magneto model, large sidecar; £80, or exchange lightweight or Douglas cash adjustment.—L., 29, High St., Woking. [2101]

**1917** Model Harley-Davidson, splendid condition; £115; Swan sporting sidecar; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9695]

**J. A. STACEY**, 12, Ecclesall Rd., Sheffield, has several H.D. combinations in stock, from 50 gns., all in perfect order; H.D.'s overhauled from 25/-; new parts extra; ask for quotation. [1687]

**HARLEY-DAVIDSON** Combination, 1915, electrically equipped, aluminium disc wheels, all sound, hood and screen, etc.; £75; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9694]

**HARLEY-DAVIDSON** Combination, 1915 Model 11F (under 2,000 miles), in perfect order, special Norton coach-built sidecar, lamp, wind screen, spare tube and all accessories, petrol; £70.—Jas. Watson, Rathfriland, Co. Down, Ireland. [X9614]

**1916** Harley-Davidson, delivered August 9th, 1916, special Harley sidecar, very little used, guaranteed in perfect condition, Palmer cord tyres, in new condition, Bosch mag., 3 lamps, etc.; what offers?—Oram, Colin Park, The Hyde, Hendon, N.W.9. [2118]

## Hazlewood.

**HAZLEWOOD-J.A.P.**, 2½ h.p., 3-speed gear, footboards, just been overhauled; £21.—Plastow, Grimsby. [X9617]

**1914** Hazlewood 5-6 h.p. Combination, J.A.P. engine, 3-speed, clutch, and K.S., speedometer, C.B. sidecar; £45, offers.—Bland and Co., Morecambe. [2098]

**HAZLEWOOD** 5-6 h.p. Combination, J.A.P. engine, 3-speed, clutch, and K.S., lamps, speedometer, special sidecar; £65; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9683]

## Henderson.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1915 Henderson, 10 h.p., 4-cyl., coach sidecar, disc wheels; 75 gns. (D) [2207]

## Hobart.

**2½** h.p. Hobart, in new condition; £30, or nearest offer.—Salter, 33, Grove St., Liverpool. [2182]

## Humber.

**HUMBER** New W.D. 3½ h.p. Flat Twin Model in stock.—Moss, Wem. [X9643]

**HUMBER**, £4/10; 3½ h.p., good condition; sacrifice.—3, Massey Park, Liscard, Cheshire. [X9477]

**PALMER'S** Garage, Tooting.—4 h.p. Humber, water-cooled, 2-speed, powerful mount; £35. [2220]

**HUMBER** Motor Cycle and sidecar, 3½ h.p.; £25.—Apply, 3, Newcomen St., Boro, S.E.1. [2106]

**HUMBER**, 3½ h.p., single speed, £11/10; 3½ h.p., 2-speed, £19/10.—Motor Exchange, Horton St., Halifax. [2086]

**HUMBER**, 3½ h.p., 1912, sidecar, 2-speed, handle start, lamps, tools, etc., good condition, most reliable.—Albrecht, 5a, Spezia Rd., Harlesden. [2084]

**3½** h.p. 1911 Humber, Roe 2-speed, been lying idle 2 years, but in good condition, property of an officer recently killed in France; a bargain to clear, 12 gns.—Apply in first instance, Taylor's Motor Works, Oxford Rd., Windsor. [2108]



## MOTOR CYCLES FOR SALE.

## Indian.

7-9h.p. Indian, 1914, 2-speed, perfect, spring frame; £35.—Fox, 28, Hugh St., S.W.1. [2114]

INDIAN, 4h.p., 2 speeds, £22/10; 7-9h.p., free engine, £23/10.—Motor Exchange, Horton St., Halifax. [2087]

1914 Indian, 7-9h.p., clutch model, excellent condition; bargain, £29/10, or exchange lower power.—Taylor, 149, Balby Rd., Doncaster. [X9656]

FOR Sale, 1916 Powerplus Indian combination, spring frame, electric light, very small mileage, beautifully kept; £68.—Apply, Neale, Cox St., St. Paul's Sq., Birmingham. [X9604]

INDIAN, 6h.p., 3-speed, late 1916, and sidecar, unpunctured, like new, with speedometer, horn, lamps not used; £65, no offers.—Winsor, Holmdene, Holstein Av., Weybridge. [2124]

INDIAN, 1913, 5-6h.p., 2 speeds and clutch, complete, lamps, horn, spare parts, etc., good condition; can be seen Saturday afternoons by appointment.—80, Duckett Rd., Harringay, N. [2064]

INDIAN Combination, 1914, 7-9h.p., T.T., spring frame, 2-speed, clutch, electric light and horn speedometer, Swan torpedo sidecar, good condition, few spares; £47.—Thorner, 26, Crumpsall St., Ahley Wood S.E.2. [2111]

INDIAN 1916 7-9h.p. Twin Super Coachbuilt Combination, spring frame, 3 speeds, clutch, K.S., hood and screen, electrically equipped, heaps spares; £70: must sell; cycle part entertained.—Box 1,510, c/o The Motor Cycle. [X9628]

INDIAN Powerplus 1916 7-9h.p. 3-speed Combination, 75 gns.; rare bargain; actually in stock; condition perfect, lamps, horn, speedometer; also 1915 late 7-9h.p. clutch model, plating and enamelling perfect, £55.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [1818]

INDIAN Powerplus 1916 7-9h.p. Combination, very little used, condition as new, a really beautiful outfit, complete with lamps, horn, tools, tyres hardly soiled; cost £119, owner will take £85 cash.—Apply, Telford Garage, 47, Streatham Hill, S.W.2. [2060]

INDIAN, 1915, 7-9h.p., racing model G., mechanical condition like new, mileage about 2,000, original tyres (Dunlops, hardly worn), fitted speedometer, registers up to 80 m.p.h., mechanical horn, head and tail lamps; £39/10, great bargain.—Whale, 56, Townshend Rd., St. John's Wood, N.W.8. [2030]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 T.T. Indian, 7-9h.p. clutch, as new, 42 gns.; 1915 ditto, 37 gns.; 1914 ditto, 33 gns.; 1914 Indian, 7-9h.p., spring frame, 2-speed clutch, kick-start, coach sidecar, electric lighting, 52 gns.; 1915 T.T. Indian, 5h.p., 3-speed, 39 gns.; 1912 Indian, 6h.p., clutch, cane sidecar, 29 gns. (D) [2205]

## James.

JAMES 1914 44h.p. Combination, done 4,000-5,000 miles, good going order; £40.—Hutchins, Foster's School, Sherborne. [X9603]

JAMES, all models, new and second-hand; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9696]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 James Canoelet combination, 3-speed countershaft, perfect, 42 gns. (D) [2206]

JAMES, 1916, 2½h.p., 2-stroke, 2 speeds, lamps and horn; £36; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2163]

JAMES, 1917, 2½h.p., 2-stroke, 2 speeds, lamps, and horn; £40: deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2164]

JAMES, 1915, 2½h.p., 2-stroke, 2 speeds, excellent condition; £32: deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2162]

JAMES 1916 Combination, Lucas dynamo lighting, Stewart speedometer, price £78; James 1916 lightweight, 2½h.p., 2-speed, £35; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9699]

JAMES, the latest 1918 5-6h.p. twin, actually in stock, also 1913 4½h.p. solo model, £22/10, with accessories; also 1916 No. 6 combination, with special silencer under sidecar, speedometer, lamps, and horn, £73, like new.—Lamb's, 151, High St., Walthamstow, and 50 High Rd., Wood Green, N. [1817]

## J.H.

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1917 J.H. coach combination, 8h.p. N.A.G., Sturmer countershaft gear, light car tyres; 88 gns. (D) [2204]

## Levis.

1915 Levis Popular; £23.—Briggs, Motors, Wellingborough. [X9670]

LEVIS New Popular and Model E. 2-speed machines in stock.—Moss, Wern. [X9642]

## Kerry.

PALMER'S Garage, Tooting.—3½h.p. Kerry-Abingdon, 2-speed N.S.U. genr, excellent condition; £12. [2217]



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## Matchless.

MATCHLESS 8h.p. Combination, new; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9698]

MATCHLESS Latest 1917 8h.p. Combination, brand new; £120.—Sons, Dunn, and Jones, Bromley Kent. Tel.: Bromley 350. [X9386]

CROW Bros., Guildford.—Matchless, latest M.A.G. combination, in stock, hood, screen, peace-time finish; also 1915 ditto, in perfect condition. [1727]

LATE 1914 Matchless, 8h.p. J.A.P., complete outfit with spares; £55, absolutely a bargain; would take Douglas part.—Lindfield, High St., Crawley. 'Phone: 65. [2042]

MATCHLESS Combination, 7-9h.p., 1915, 3-speed gear, lamps, horn, and spares, new condition, not used this year; £75, or near offer.—Walker, 67, Conduit St., Leicester. [X9650]

MATCHLESS War Model, equal to new, complete with spare wheel and tyre, special sidecar, hood, screen, 3 Lucas lamps, horn, guaranteed; £110.—Walker, 44, Plumstead Rd., Plumstead, S.E.18. [2083]

1914 Matchless Canoelet Combination, 8h.p. J.A.P., Binks, Bosch 2-speed, wind screen, horn, lamps, all spares, tyres as new, 60 m.p.g.; £45, lowest.—Pierce, 27, Dumbarton Rd., Clydebank, Glasgow. [2039]

MATCHLESS (two) 1917 8h.p. J.A.P. Combinations actually here; £120 and £125 respectively; spare wheel in both cases; easy payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [1916]

## Minerva.

3½h.p. Minerva, good condition; bargain, £12.—Box L5,234, c/o The Motor Cycle. [2193]

MINERVA, 3½h.p., in perfect condition, Bosch mag.; 11 gns.—The Wellho Motor Garage, Woodford Rd., Forest Gate. [2160]

## New Hudson.

NEW Hudson, 3½h.p., 3-speed, clutch, Bosch mag.; £37/15; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9678]

1915 2-stroke New Hudson, 2-speed, free engine, fully equipped, in perfect condition, including tyres; bargain, 17 gns.—The Wellho Motor Garage, Woodford Rd., Forest Gate. [2159]

## New Imperial.

CROW Bros., Guildford.—New Imperial, latest 2½h.p., 3½h.p., 6h.p. models in stock; also sound second-hands. [1047]

1916 New Imperial-Jap, 2 speeds, perfect condition; accept best cash offer.—17, Calverley Rd., Tunbridge Wells. [2149]

1915 New Imperial-Jap, 2½h.p., 2-speed, good order; £23; close offer or War Loan.—Gwinn, Vicarage, Sheringham. (D) [X9712]

1917 New Imperial-Jap, absolutely equal to new; 32 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. Closed Wednesdays 1 o'clock. [0932]

IMPERIAL-J.A.P., 2-speed, clutch model, £27/10; also new models in stock; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9679]

NEW Imperial-Jap, 1915, 2½h.p., 2-speed model; £27; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2179]

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1916 New Imperial, T.T., 2-speed, knee-grips, Miller lamp, Lucas horn; 28 gns. (D) [2208]

2½h.p. New Imperial, 1915, 2-speed gear, plating and 22 enamelling as new; £25; lady's or gent's pedal cycle part.—Lindfield, High St., Crawley. 'Phone: 65. [2041]

NEW Imperial 8h.p. J.A.P. Overseas War Office Combinations, as described in detail pages 252-3, Sep. 13th issue of this paper, exceptional machine in every detail; immediate delivery from stock; £114/9.—Colmore Depot, Distributors, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886]

## Norton.

NORTON.—All new models supplied; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9685]

## N.S.U.

N.S.U. 6h.p. Twin, T.T., two speeds, winner of many hill-climbs; 20 gns.—77, Acre Lane, S.W.2. [2125]

N.S.U., 3½h.p., 2-speed, new 1917 coach sidecar; £24/10.—Motor Exchange, Horton St., Halifax. [2088]

N.S.U. 4h.p. Combination, free engine, good tyres, just been overhauled, all accessories; call after 6 or Sundays; bargain, £16.—87, St. James's Rd., Croydon. [2151]

HAVING Acquired the Entire Stock-in-trade of the N.S.U. Motor Co., Ltd., we can now supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Egles and Co., Acton Hill Works, Acton, W.3. [X9624]

## O.K.

O.K. Juniors.—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn. [0910]



## MOTOR CYCLES FOR SALE.

## P. and M.

**P. and M.**, 3½ h.p., 2 speeds, cane sidecar, good order; £22/10.—Motor Exchange, Horton St., Halifax. [2089]

**P. and M.**, bought August, 1914, 1916 coachbuilt sidecar, mileage 3,220, 2,000 solo, used summer months only, practically new condition, Stewart speedometer, lamps, tools, mirror, etc.; any trial or expert examination; 53 gns.—Davies, London House, Newcastle Embury. [2080]

## Perfecta.

**PERFECTA**, 2½ h.p., 4-stroke, N.S.U. 2-speed and F.E. U.H. mag., Druid forks, aluminium footboards, head and rear lights (acetylene); £15.—Write to Lindley, Soho Hall, Handsworth, Birmingham. [X9636]

## Pope.

**PALMER'S** Garage, Teotting.—7-9 h.p. brand new 1916 Pope, superb machine; £84. [2221]

## Precision.

**T.T. Precision**, 1913, 3½ h.p., tyres excellent, all lamps, spare tank, etc., fine all-black finish, new piston rings; £22; after 7 p.m.—G.R., 21, Dover Rd., Kirkdale, Lancs. [X9664]

## Premier.

**LATE** 1913 Premier, 3½ h.p., countershaft gear, chain-cam-belt, all accessories; bargain, £20, quick sale.—132, London Rd., Caine, Wilts. [2141]

**PREMIER**, 1914, 3½ h.p., 3-speed, clutch, and K.S. Stewart speedometer, lamp, head horn; £34/15. 1916 combination; £66. E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [X9690]

**PREMIER**, 1913, 3½ h.p., countershaft gear and clutch, fitted with coachbuilt sidecar; £38. deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2177]

## Quadrant.

**QUADRANT** Late 4½ h.p. Combination, 3-speed, and clutch, lamps, O.B. sidecar, perfect throughout; £44.—Garland, 3, Beulah Terrace, Elm Grove Rd., Weybridge. [2116]

**4½ h.p. Quadrant**, late 1915, B.S.A. 3-speed gear, and Millford Empress sidecar, all accessories and spares, perfect condition; £50.—H. Roe, 48, Arden Rd., Church End, Finchley. Tel: Central 12780. [2048]

## Radco.

**1916** Radco 2-stroke, in nice condition, guaranteed; 18 gns.—The Wellboy Motor Garage, Woodford Rd., Forest Gate. [2158]

**RADCO**, 1917, 2½ h.p., 2-stroke, as new; £25; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X9693]

## Rex.

**REX**, 6 h.p., mag., and cane sidecar; bargain, £15/10.—Motor Exchange, Horton St., Halifax. [2090]

**3½ h.p. Rex**, Bosch, B.B., wicker sidecar, also spare 2-speed, free clutch, wheel damaged; £15 cash.—Saow, Rothley Rd., Mountsorrel. [X9658]

**REX**, 3½ h.p., just rebushed and overhauled, Bosch mag., B. and B., in perfect running order; £10/10.—Moore, 40, Catherine St., Elland, Yorks. [X9646]

## Rex-Jap.

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—8 h.p. Rex-Jap, 1917, coach sidecar, Sturmer countershaft gear, as new; 72 gns. (D) [2201]

## Rover.

**ROVER** New 3½ h.p. Combination, 3-speed, and T.T. models in stock.—Moss, Wem. [X9644]

**ROVER**—All new models supplied; E.P. or exchange.—Service Co., 292, High Holborn, London. [X9676]

**ROVER** T.T., equal to new; 55 gns.; 1917 model.—Julians, 84, Broad St., Reading. 'Phone: 1024. [2029]

**ROVER**, single-cyl., Simms mag., B. and B., good tyres, Druids; must sell; £12.—46, Mary Rd., West Bromwich. [X9630]

**1918** T.T. Rover, Philipson hand control pulley, just arrived from works; £87/10.—Briggs, Motors, Wellingborough. [X9669]

**ROVER**, 1917, 3½ h.p., 3-speed, kick starter, clutch, semi T.T. bars, recently cost nearly £85, only 60 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. Closed Wednesdays 1 o'clock. [20930]

## Royal Ruby.

**ROYAL Ruby**—All new models supplied; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9686]

**ROYAL Ruby**, 2½ h.p., late 1915, perfect condition throughout, lamps; £17, or near offer.—N. Cobbold, Battisford, Stowmarket. [2137]

**ROYAL Ruby**, late 1916 De Luxe Model, Jardine countershaft gear, tools, lamps, etc., perfect condition; £35, or near offer.—Douglas, 58, Castle St., Bolton. [X9658]

## Royal Sovereign.

**PALMER'S** Garage, Teotting.—3½ h.p. Royal Sovereign, waterproof mag.; clearance bargain, £10. [2214]

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1918 A.J.S., 6 h.p., 3-speed .... £91 6  
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 1917 ZENITH-GRADUA, kick-starter..... 75 Gns  
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 1917 ROVER, 3-speed, clutch .. £80 0  
 1917 ROVER, 5-6 h.p., W.O. model, J.A.P. 3-speed..... £97 10  
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 1917 ROVER, 3-speed, as new .. 66 Gns  
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 1917 LEVIS, 2½ h.p., single-speed 35 Gns  
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## MOTOR CYCLES FOR SALE.

## Rudge.

**RUDGE** Multi, 5-6 h.p., coachbuilt sidecar, very smart; £45.—Motor Exchange, Horton St., Halifax. [2097]

**3½ h.p. Rudge**, clutch model, 1912, splendid condition; £18/10.—Lindfield, High St., Crawley. 'Phone: 65. [2040]

**RUDGE**, Multi-grade gear, 3½ h.p., guaranteed perfect; 16 gns.—The Wellboy Motor Garage, Woodford Rd., Forest Gate. [2157]

**1913 3½ h.p. Rudge** Multi, fully equipped and guaranteed; £22, bargain.—The Wellboy Motor Garage, Woodford Rd., Forest Gate. [2156]

**1915 3½ h.p. Rudge** Multi, fully equipped, a lovely machine, guaranteed; bargain, £40.—The Wellboy Motor Garage, Woodford Rd., Forest Gate. [2161]

**RUDGE** Multi 1914 Combination, in thoroughly good order, fitted with electric light, ready for road; £27.—Milford, Staff, Monte Video Camp, Weymouth. [2052]

**RUDGE**, 1916, 3½ h.p., Multi gear and clutch, lamps, and horn; £42; deferred payments arranged.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2172]

**T.T. Rudge** 1912-13, 3½ h.p., engine just rebushed, large adjustable pulley, long exhaust, 2 lamps, sporty mount; £20; after 6 p.m.—T.A.H., 9, Trafalgar Rd., Birkdale, Lancs. [X9666]

**RUDGE** Multi, 1914, 5-6 h.p., Millford cane sidecar, re-enamelled, overhauled, all accessories; £45; seen by appointment.—Lieut. Clough, South Midland Royal Engineers, Southbourne, Haats. [X9591]

**RUDGE**, T.T. Multi, £29/10; 1914, fitted for substitute, £33; 1914, I.O.M. engine, mechanical horn, lamp, knee-grips, T.T. bars, £31; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9677]

**RIDER TROWARD** and Co., 31 and 78, High St., Hampstead.—1916 Rudge-Multi, Milford Skiff sporting sidecar, 52 gns.; 1917 Rudge Multi, 47 gns.; 1914 Rudge-Multi, 6 h.p., 37 gns.; 1913 Rudge-Multi combination, 33 gns.; 1913 T.T. Rudge-Multi, 27 gns.; 1912 Rudge-Multi, 23 gns.; 1913 T.T. Rudge, Philipson, 25 gns.; 1913 T.T. Rudge, 23 gns. (D) [2209]

## Scott.

**SCOTT**, 1913, Bosch mag.; £37/10; 2-speed, clutch and kick starter; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9680]

**SCOTT**, late 1912, Binks carburetter, Best and Lloyd lubricator, Jones speedometer, perfect order; £30.—Write to Lindley, Soho Hall, Handsworth, Birmingham. [X9655]

**SCOTT** 1914 Combination, 3½ h.p., 2-speed, kick start, recently overhauled, spare chains and numerous small accessories, tyres new, Miller lamps, etc.; £40.—Wiseman, Skating Rink, South Shields. [X9588]

## Singer.

**SINGER** Lightweight, 1912, 2 h.p. model, in fine order, £15.—Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [2178]

**1915** Singer, 2½ h.p., 2-speed, clutch, speedometer, lamps, horn, Palmers; cheap, £28; lamp set.—H. W. Scales, West Butterwick, Doncaster. [X9632]

**3 h.p. Singer**, requires a little tuning, Bosch mag., B. and B. carburetter, mechanically sound; would take a good gent's push cycle and a little cash; offers wanted.—Lindfield, High St., Crawley, Sussex. [2044]

## Sparkbrook.

**SPARKBROOK** 2-stroke, 2-speed gear, lamps, horn, and tools, 1915, beautiful gear; £25; good gent's cycle part.—Lindfield, High St., Crawley. 'Phone: 65. [2043]

## Sun.

**PALMER'S** Garage, Teotting.—2½ h.p. 1915 Sun-Villiers, 2-stroke, 2 speeds; £20. [2218]

## Sunbeam.

**SUNBEAM** New 3½ h.p., 3-speed Countershaft W.D. Model actually in stock.—Moss, Wem. [X9645]

**SUNBEAM**, 3½ h.p., 1914, 3-speed, speedometer, lamps, horn; £55.—2, Hogarth Rd., Earl's Court. [2158]

**SUNBEAM**, 1914, 6 h.p., 3-speed countershaft, Coney speedometer, Lucas head and rear lamps, Binks carburetter, Gloria sidecar, only wants seeing; £75.—Thompson, 408, Commercial Rd., Portsmouth. [X9711]

**SUNBEAM** War Model Combination, 8 h.p. M.A.G., coachbuilt sidecar, hood, screen, Lucas electric set complete, interchangeable wheels all round; cost £150, accept for quick sale £115.—Koy, 34, Stanley Rd., Whalley Range, Manchester. [X9584]

## Swift.

**SWIFT** and C.B. Sidecar, 1915-16, 3½ h.p., clutch, and K.S. complete with lamp and horn, splendid condition; £49/10; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [X9682]

## Triumph.

**1914** Triumph, 4 h.p., 3-speed, free engine; £38.—Briggs, Motors, Wellingborough. [X9673]

**1911** Triumph, 3½ h.p., new tyres, lamps, horn, pump, mirror; £15.—Waters, Walton, Norfolk. [2049]

## Instructions for amateurs to enamel a motor cycle

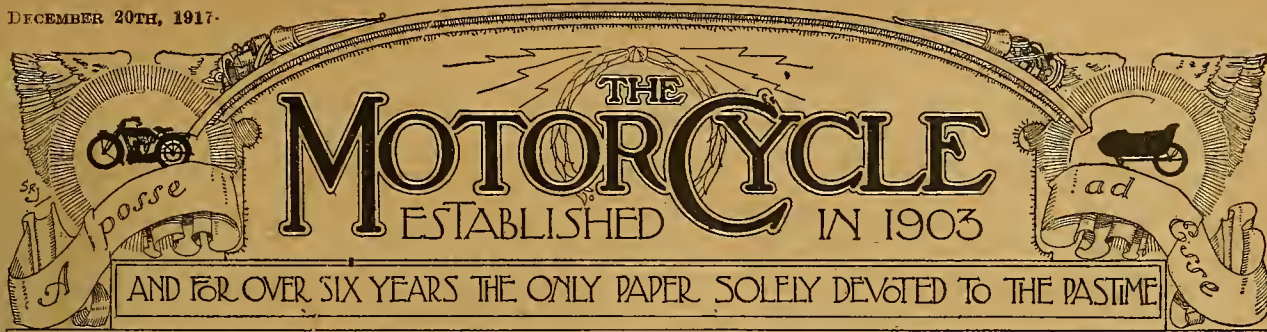


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**Our Christmas Greetings.**

**E**LSEWHERE in this number we issue our greetings to our readers scattered over the world, for never since our first issue have they been so widely scattered, and never have our greetings been more sincere, yet so difficult to frame in adequate words of sincerity. The old and hackneyed phrases fall short of the time and condition of things, for many of our old friends, we realise, will be living, when this issue reaches them, amidst conditions that hardly coincide with the cap and bells of the jester's heyday. Therefore, we cannot do more than wish them all a speedy and glorious return to the old country, in whose cause they are sacrificing so much.

Christmas is essentially a festivity of the fire-side, but once again we have to accept the gloomy fact that the true Christmas spirit will be lacking. For us at home the old-time Christmas pudding is forbidden fruit, the mistletoe and holly berries but a sad reminder of the jovial society which this year plays no part in our humble celebrations.

Many old couples will be dining alone this Christmas—clinking their glasses in a solemn and devout toast to "The Boys! May they return well and happy." In thousands of homes throughout the kingdom the toast will be drunk, not in a spirit of festivity and song, but with a sincerity and patriotism which bears no taint of phrasemaking—a quiet unity of thought which demands no stimulant in the way of oratory.

Christmas is not a period to be lightly passed over or upheld purely for the sake of pleasure. The margin between love of home and love of country is but a narrow one, and to many millions of the world's people Christmas and home are inseparable. Thus Christmas plays an important part, stamped on our memories from the days of earliest childhood, in establishing that sense of what home really means to the

Britisher the world over—home which is worth fighting for in far-off foreign lands.

Next Christmas, let us hope, we shall be able to celebrate the season as never before—a frosty spin by highway and byway, a cosy fireside with plenty of good cheer, both mental and physical. It is a thousand pities that the old customs, with their atmosphere of unity and good fellowship, should die, and, though to-day we are scattered about the globe, let us hope that the season will not be passed without some sense of goodwill—even though peace on earth be impossible.

**A Laudable Example.**

**W**E recently published an appeal for motorists to join the London Motor Transport Volunteers, to carry on the excellent work of transporting soldiers from one London terminus to the other. We gave some statistics of the valuable work being performed, stating that this organisation was carrying on excellent work, but was in need of additional members, who are always provided with petrol while they are actually engaged on duty. In *The Times* of Monday, November 19th, reference was made to one patriotic motor cyclist as follows:

"Every conceivable sort of car is there, from a 5 ton commercial waggon with twin back wheels to a motor cycle and sidecar. There is, indeed, one of these devotees who has not missed a single night's duty since he joined the force. He has no motor car, and his age is perhaps the wrong side of fifty; but he has a motor bicycle and sidecar. Every night he is on duty. He leaves Bushey shortly after one o'clock in the morning, wet or dry, makes for Euston, and works between stations until eight."

To those who believe that example is better than precept, we would commend this example of really heroic work.



1917.

*Scudding through the darkness  
Half across the plain,  
With the wind against you,  
And a biting rain,  
Skidding where the pools lie  
Dank amid the clay,  
Knowing there's a strafing  
If the mails delay.*

*Then you think of firesides  
With a long regret,  
Peaceful, easeful evenings—  
Book and cigarette,  
Eiderdowns and pillowslips,  
Coffee cups and frills,  
Late p.m. on P. and M.—  
Home's a thought that thrills.*

19?

*Dreaming after office hours  
By electric light,  
In a stuffy sitting-room—  
Of another night!  
Civilised and sanely clad,  
Cleaned and groomed and fed,  
Shall we ache for those glad rides  
In the days long dead?*

*Can we come again, chum,  
To the things that seem  
Sweet and so alluring  
In a war-time dream?  
Will other thoughts then thrill us,  
Restless as we are,  
When the old world claims us,  
Chum, beyond the bar?*

SOPHIE C. ELIOTT-LYNN.



## OCCASIONAL COMMENTS.

By "IXION."

## Steadying a Sidecar.

A FRIEND asks me to mention in this column that he was rather disappointed with the springing of his new sidecar, which oscillated more than he considered justifiable. One wet day he put the hood up, and found it rode beautifully. From this he deduces that most sidecars would be more comfortable if the recoil of the main springs were damped with auxiliary shock absorbers.

## The Hour Record.

SEVERAL manufacturers have so far improved the efficiency of their engines during the war that they consider the hour record is safe in their pockets. They say openly that their engines have only to reproduce on the track test performances already accomplished repeatedly on the bench under less favourable conditions to ensure a positive slaughter of the pre-war figures; and as Brooklands is being repaved with an increased thickness of concrete the first fliers after peace is declared should have every chance to show what their bicycles can do. On the other hand, I hear of quiet enquiries for a rider of reputation who is willing to ride a 100 m.p.h. machine. I rather fancy that speed advertisements of this type will be both sensational and short-lived during the first few months of the post-war competition.

## The Last 500 c.c. T.T.?

A CORRESPONDENT writes sadly that we shall never see another  $3\frac{1}{2}$  h.p. T.T. for the reason that the Isle of Man would never hold the ginger machines of that size which he anticipates will be produced after the war; they would swirl clean off it as soon as things began to get exciting. He may

be right. I don't consider that the power output of the 1920 500 c.c. will be amazingly greater than that of 1914, for if the war has taught us how to get about double the familiar output out of a given c.c., it has not taught us how to do so on the cheap. But this hardly affects racing. When a firm deliberately adopts a Brooklands and T.T. policy, it spends money like water: and ideas which would give a brass

hat in the Production Department of the Ministry of Munitions the cold staggers are nothing accounted of where the hour record or a team win in Manxland is concerned. Consequently, I shall expect to see the speed records soar with great steepness and regularity when racing is resumed; but I am not so sure that the stock machine sold to the public will be much of a bombshell. On that basis a 350 c.c. limit for the next T.T. looks a sound bet



*The Editor and Staff of THE MOTOR CYCLE wish all readers—those at home, those on the seven seas, those in the mud of Flanders; under the burning sun of Egypt, East and West Africa, Palestine, and Mesopotamia; those among the mountains of Italy and the Balkans, and those in the outposts of the Empire—*

**A CHEERY CHRISTMAS AND A  
TRIUMPHANT AND HAPPY NEW YEAR.**

## Some Thrill.

ONE picture palace usually lasts me for half a year unless a motor race or Polar film is going the rounds, but I filled in an

idle hour at one last week and bristled in my chair when the legend shone out "The Motor Cycle of the Future." A mournful anti-climax was in store. There waggled on to the screen a conventional sidecar outfit, with a hideous gasbag hoisted above it on a kind of scaffold, the bag coming so low that the sidecar passenger was apparently suffering from a crick in the neck in his efforts to avoid rubbing his cheek on the container. All very nice for the petrolless souls in wartime, certainly; but I don't fancy we shall hear very much of the new fuel outside test shops when frightful Fritz withdraws his terrors from the tank steamers, or when Tooting becomes a mass of spouting oil wells.



## COAL GAS



## IN PRACTICE.

## SOME NOTES ON THE USE OF A FLEXIBLE GAS CONTAINER.

SOME little time ago we announced that we were procuring a motor cycle gas trailer, mounting a flexible bag for the purpose of a practical road test, and as three or four hundred miles have now been covered with the trailer in tow we are in a fair position to set before our readers a few notes concerning the results.

The gas trailer complete was supplied by Messrs. Douglas Cox, and was the smallest size produced by that firm, having a capacity of approximately 120 cubic feet. It was delivered to us complete in every respect, the connection from the bag consisting of a length of rubber hose with union and tap for leading gas direct to the carburetter of the machine. We have utilised this connection for filling, which takes about forty minutes, though the bag is provided also with a large trunk for connecting direct to the main. The end of this trunk, however, must be bound up after each refill in a way that will ensure a perfectly gas-tight joint, which promised to be rather a troublesome business, and, since the tap at the end of the flexible hose was of the same thread as the socket terminating the main from which we proposed to fill up, the use of this pipe suggested the simplest method.

The tests were made on a 6 h.p. latest model A.J.S.—an engine which, though remarkable for steady pulling, is of the

low compression type, and it is conceivable that the difference in power developed between coal gas and petrol would not have been so marked had an engine having higher compression been used.

## Carburation Arrangements.

The existing carburetter was adopted for the gas as follows: The brass tap connection from the gasbag was screwed into the junction of an ordinary  $\frac{3}{4}$  in. cast iron T piece, the junction being  $\frac{1}{2}$  in. in diameter. One end of the T was turned out so as to be a driving fit on the boss of the air intake of the Amac carburetter, and at the other end, by means of a nipple, an elbow was fixed to face the direction in which the machine travels, so as to reduce wastage by blow back. Immediately the engine is started the gas tap is turned "off" till irregular running, owing to too weak a mixture, sets in. The tap is then turned slowly on again, the point at which an even purr is resumed being taken as the correct mixture. All controlling is then done by the carburetter throttle, the air lever being fixed fully open, though for up grades or very flat going it is found advantageous occasionally to vary the mixture by the gas tap.

This is, of course, a very rough and ready method of using the gas, permit-

ting a certain amount of wastage, but it is taken that the average rider will employ methods equally rough and ready. We have in course of manufacture a simply designed gas carburetter, and it will be interesting to note at a later date how this fitment compares with the present method.

## The Gasbag.

The gasbag is not of the more costly type produced by Messrs. Barton, but is one of the "ordinary" patterns supplied to meet popular demand, and we believe that the makers of it have experimented very considerably in their efforts to arrive at a way of treating the material which will render it quite gasproof. The bag in our possession, however, leaks considerably. If garaged overnight in a fully inflated condition, it will be found quite slack the following morning. The leakage in twenty-four hours we find to be over 25 cubic feet; so it may be taken that, if these bags are to give safe and efficient service, some more effective method must be contrived.

Not only is this loss wasteful and objectionable, but it brings about numerous difficulties. Servant girls are apt to wander about at night time with lighted candles, and in these days Sarah Jane is becoming scarce enough, without hastening her exit from earth by the use of a



The Cox 120 cu. ft. gas container attached to the 6 h.p. A.J.S. with which it was used.



**Coal Gas in Practice.—**

gasbag. The works manager informs us that the drayhorse will not eat his food if the gasbag is anywhere near; and sometimes when the trailer is left in a spacious warehouse, the whole atmosphere of the place becomes polluted. In these days one can overlook the fact that the fitment is unsightly in appearance and difficult to garage, but wastage of this kind must be eliminated or success for the scheme is impossible.

Incidentally it may be added that great care has been taken not to strain the seams of the bag by overcharging, but a good deal of mud is plastered on to the fabric by the rear wheel of the motor cycle, and we rather think that this does not increase its gas-retaining properties, just as mud on a canvas tent will cause rain to stream through. The canvas is rubber treated, and therefore a waterproof oil must not be applied.

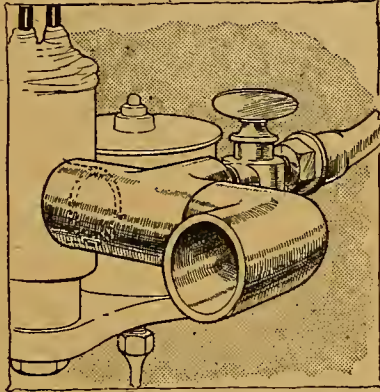
**On the Road.**

Now as regards the actual running on coal gas, the results have proved to be equal to our expectations. The carburettor was tuned for high r.p.m., and therefore a slow tick over was not permitted with petrol. With the gas fitment, on the other hand, a most remarkable tick over is obtainable—no sound other than the steady working of the valves being audible. Given favourable conditions in the way of a following wind, the machine is capable of attaining the same road speed on gas as on petrol, viz., 48 m.p.h., but nothing like the same power is obtained. When running on coal gas the power falls off instantly with the revs., and a change down is necessary for quite small hills. Taken all round we should say that coal gas is about 4 m.p.h. slower than petrol.

We have experienced no trouble whatever with overheating, but slightly less oil is used. Similarly, we have had no trouble in starting, except on very cold mornings, when the engine does not become free after a few turns on the dry

gas as it does after flooding the carburettor. Even an injection does not have the same effect, and it has proved necessary once or twice to flood the carburettor and start on petrol.

Owing to the high point (over 500° C.) of spontaneous ignition of coal gas, it is impossible to obtain a knock, however long a change down be postponed. The engine will flog itself to a standstill without a suggestion of a knock, which certainly does not apply when petrol is used. We found, indeed, when running



The gas carburettor attached to the air intake of the Amac. It consists of a cast iron  $\frac{3}{4}$  in.  $\times$   $\frac{1}{2}$  in. T-piece, nipple, and elbow.

on petrol and towing a full trailer, that if the faintest whiff of gas be turned on when knocking begins, the knock immediately ceases.

The best method of running has proved to be to turn off the gas at the tap as far as the engine permits, then run with the throttle wide open. Thus, though an economical mixture is used, a very full charge is drawn into the cylinders, giving the effect of high compression, and while this system of driving seems to be as

economical as any, it further enables the engine to maintain a healthy bark and a reasonably high road speed.

So far our mileage per charge has proved to be about twenty-two, which is far from being satisfactory. Our riding has consisted of five-mile journeys, however, each consumption test extending over twenty-four or thirty-three hours, so that the poor results can be assigned mainly to leakage of the bag. This has prevented us from arriving at any useful data as regards comparative results, but the petrol consumption of the machine is approximately 70 m.p.g., so that we should obtain thirty-five miles per charge.

**Reversing!**

The trailer is a few inches wider than the sidecar, and when negotiating a right-angle corner care must be taken not to remove pedestrians from the corner of the kerb—otherwise no great difficulty has been experienced in town riding. All sorts of complications begin, however, if one attempts to push the outfit backwards, the trailer shooting off at the most unexpected angles. On one occasion we entered an hotel yard crowded with farm carts, and were promptly instructed to retreat by the way we had come—the only way. Such a retreat was impossible, however, till we had commissioned the hotel boots to carry the trailer bodily while we pushed the machine!

We tested the outfit on petrol with the gasbag fully inflated for wind resistance, and found that it made no difference to the speedometer reading, except against the wind. Then the resistance was very noticeable, and with a machine having a smaller engine it would present a real difficulty.

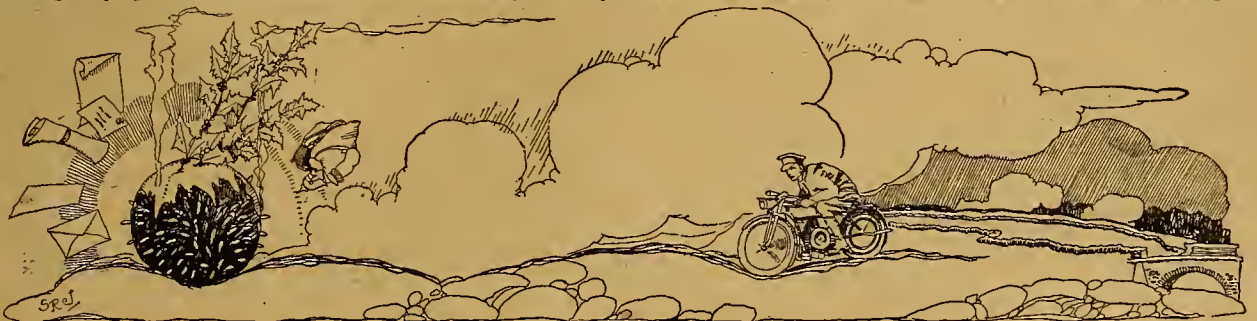
For some considerable time now the gasbag has enabled us to cover the five miles between home and business four times daily without trouble and without hold up of any kind. Given a really gas-tight bag we should be entirely satisfied with the result.

**GERMANY'S FAITH IN ELECTRICITY.**

INTERESTING discussions in Germany, of which reports have reached this country, indicate that great reliance is to be placed on intensive development of electric power as a chief agent of rapid reconstruction of industrial prosperity. One of our most eminent consulting engineers has favoured *Electrical Industries* with the following pithy and emphatic comment on these designs of our chief enemy: "It is true that Germany had before the war gained enormous economic advantage by public encouragement of

electrical science, but a far greater cause of other advancement has been our gross neglect of our own opportunities. If the war has at last opened our eyes to the terrible dangers of national ca' canny, we may comfort ourselves with the following solid unassailable facts: England is the most favourably situated country in the world for deriving public and private benefit from electrical progress, and can, if she choose, have a supply of electricity laid on practically everywhere, like water,

cheaper than Germany or any other big country on earth. With this priceless blessing England can not only defy competition in a wide range of manufacturing industries, but can bring about a wonderful revival of agriculture and abolish domestic drudgery. Whatever Germany can do we can do twice as well in this field, if only our people will drop their pettifogging parochial notions of electrical development and support the establishment of single-minded administration from a broad national standpoint."





# A RACE WITH RUIN

By Angelina Simpkins,

AUTHOR OF "THE ELOPEMENT OF ARAMINTA," "LILACS & LOVE," ETC.

**S**NOWFLAKES were falling. Within the cosy room a great log fire was crackling merrily. Chestnuts were toasting on the hob. It was exactly the right sort of night for a Christmas number.

In a big armchair could be seen a well-built, handsome figure. Dick Trevelyan was eating chestnuts and conjuring up visions of Mary and the morrow.



"Bound with a hundred feet of leather belting."

So rapt was he in thought that he did not see the dark shape which crept silently across the floor. The intruder was taking each step under cover of the explosion of a chestnut. He had been doing so for hours, so deserved some reward for his patience.

Four chestnuts burst in quick succession. Instantly a pad of chloroform was thrust in Dick's face. A minute later he was gagged and bound with a hundred feet of leather belting.

The villain turned to go. With a violent effort at once mental and physical he refrained from either hissing or clenching his teeth.

"Ha, ha!" he said, almost naturally. "I do not think you will ride for the Thousand Guinea Stakes to-morrow, Lord Richard. I learnt those knots from Nevil Maskelyne!"

The door closed behind Racing Rufus, the most famous motor cyclist of the day.

The dawn had broken when a girlish figure stepped into Dick Trevelyan's rooms by the judges' stand of the Thousand Guinea Stakes. In fact, it had been fractured many times, and the pieces were lying about in all directions.

Lady Mary Carstairs gave a gasp of horror when she saw her lover lying huddled in the great armchair.

"Dick," she cried, tearing out the gag, "quick, what has happened?"

"Undo these knots, darling. There's only ten minutes to get to the course! It's that red-bearded scoundrel, Rufus—the only man with a chance against me!"

"I can't," she murmured hysterically, "I've only got as far as reef-knots. Dick, I'll ride your race myself. I—I've always wanted to ride a motor bike."

"No, no! A knife——" But she had replaced the gag.

Nine minutes later the girl was standing beside motor cycle No. 99, disguised in a huge pair of goggles, waiting for the flag to fall.

Let her wait.

The Earl of Amulree had sworn that his daughter should never wed a man who could not earn a living wage. Pressed for details, he had suggested £2,000 a year as a sum to keep the wolf from the door. And all the year Dick Trevelyan had been beset by ill-luck. He had failed as a tram conductor, a stockbroker, and a food



"The girl was standing beside motor cycle No. 99."

controller. Even as a taxi driver he had scraped together barely half the necessary amount. The Thousand Guinea Stakes was his last chance of winning his beloved, unless he were to cast pride to the winds and go into the grocery trade.

From the vast *débris* of motors and machinery left over by the ten years' war he had made a motor cycle of his own. With all the genius of a correspondence column inventor he had utilised the wheels of a staff Daimler, part of the chassis of a tank, and 4ft. wide D.R. bars, combining the whole round the engine of a wrecked triplane. It had taken him a complete week to make.

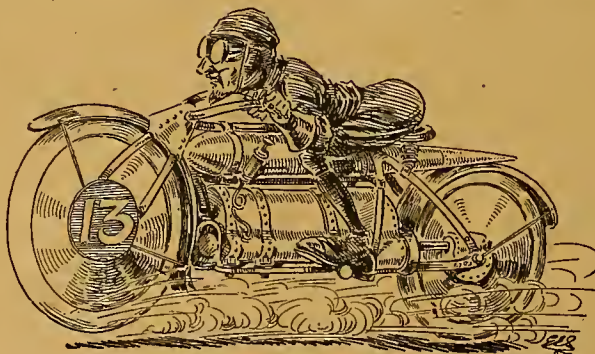
He had been confident of success. So had Lady Mary.

The flag fell. The vast field leaped from the mark as one man. But at once a crimson shape drew ahead from the rest, and sped in front along the broad concrete highway.

"Thirteen! Thirteen!" yelled the sycophantic crowd.

It was Racing Rufus on his hydrostatic turbine.

Miles and miles he flew along, and ever he gained



"It was Racing Rufus on his hydrostatic turbine."



## A Race with Ruin.—

on the common herd. The road grew jagged with broken records. But he little recked of a purple mass of roaring machinery creeping, ever creeping up in the far distance. Ha! Not a word.

Mary had had trouble at the start through not knowing which way to turn the taps. But soon her nimble fingers found the right lever, and she was borne forward in a great rush, clinging desperately to the four-foot handle-bars.



"The Earl of Amulree bearing a huge gold cup."

The next few minutes were a confused dream. Dozens of machines were missed, scraped, or collided with. But still No. 99 surged onward unscathed. It seemed as though the motor cycle felt itself what fortunes were at stake that day.

Once a small two-stroke skidded, and was crushed to powder beneath the giant wheels. But in the confusion nobody missed it.

At last the mob was left behind, and the road was empty. Empty——save for a red streak breasting a hill many miles ahead. It seemed impossible to overtake it.

Mary was almost despairing, when, in feeling for a pocket-handkerchief, her hand touched another lever. At once the purple racer bounded ahead at nearly double the speed.

Racing Rufus rode on, dreaming of staving off bankruptcy with the thousand guineas, which he looked upon as already won. Suddenly a distant throb quickened into a roar. A huge mass of almost red-hot machinery flew past him, tearing off his front mudguard as it went. He caught sight of a slim girlish figure perched above it.

With a bitter curse he leant down and ground in the valves, oiled the tyres, and tried all those devices which a racing motor cyclist knows so well to increase his speed on nearing the tape. But, had it not been for an unforeseen accident, he would have looked his last on No. 99.

Mary was already in sight of the finish. She could see the judges' stand, gaily bedecked, the vast crowd of fashionably-dressed racegoers, the window behind which her lover lay bound and gagged. She had just caught sight of the Earl of Amulree, bearing a huge gold cup in his hands, when a glance at the handle-bar mirror forced from her a sound between a groan and a sob. In a man it would have been a snort. She applied the vacuum brake and the reverse, and stopped the huge motor cycle dead in its tracks.

Her hair was coming down.

A minute was wasted in repairing the damage, and another in turning the handle to start the unwieldy machine again. Before the brave girl could gather way, Racing Rufus was upon her in a crimson cloud of steam and oburgations.

For a moment Mary gave up hope. Then that quick inspiration which has made women supreme came to her aid. She seized a hatpin, and thrust it violently into the villain's magneto as he flew past. The turbine staggered and reeled in spasms of backfiring. Before it could recover, No. 99 was across the tape.

Mary fell fainting from the saddle as the tape broke, and the faithful 99 sped on, ever gathering speed, and vanished unnoticed over the horizon. The Earl made a quick step forward to gather his daughter in his arms.

But, before he could reach her, a harsh laugh made everyone turn in the same direction.

Racing Rufus had found the hatpin, but too late. Now he saw his hopes reft from him, and himself condemned to languish in a debtor's gaol, by a golden-haired girl of seventeen. With a snarl of mingled rage and disappointment he guided the full force of his hydrostatic turbine straight for the defenceless form which lay unconscious in the roadway.

The suspense was dreadful.

Dick Trevelyan had spent all day biting through his bonds. His teeth were good, and at last he succeeded. When the last strand parted, he staggered to the window in time to see the thrilling finish. Now he was faced with the horror of seeing his loved one ground to dust by the juggernaut wheels.

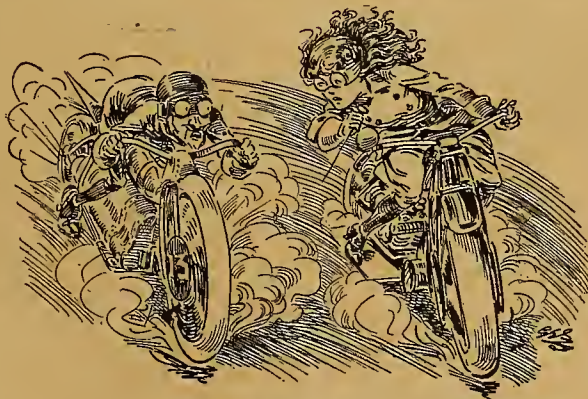
Shutting his eyes, he drew a revolver and fired. There was a loud explosion, and Racing Rufus disappeared from the face of the earth. Dick Trevelyan's bullet had struck a sparking plug, and the electricity had blown up. The hydrostatic turbine had run its last race.

A moment later the lovers were in each other's arms, sheltered by an umbrella from the fragments of Racing Rufus, which were still falling from the cloudless sky and striking the earth with sickening thuds that reminded the bystanders of an "Archie's" swan song.

True love had conquered.



"A moment later the lovers were in each other's arms."



"She seized a hatpin."



# FLYING

## FACTS AND THEORIES

### SOME FURTHER POINTS ABOUT SCREWS.

By W. E. ASTON, A.M.I.A.E.



FROM conversations that I have by chance overheard I judge that there is more popular misconception about the way in which an air screw works than any other component of the aeroplane, and a few short notes upon this subject, therefore, may be not without value. Although it is attended by a great many varying factors, the combined influence of which it is not always easy to bear in mind, there is nothing very mysterious or abstruse about the principle on which the air screw works. It is simply the special case of an aeroplane, travelling along a circular path instead of a linear one, and through its rotation by the engine it gains a thrust, exactly as an aeroplane does its lift, by the reaction produced from the volume of air which it engages and to which it imparts a backward acceleration. The power it absorbs in this manner is determined by the weight of air dealt with in unit time, and by the velocity to which it is accelerated.

There is a widely held idea that a screw requires the same power to drive it at a constant speed no matter under what conditions it is working; in short, that it always gives the same thrust. This is quite fallacious. Another well-hugged notion is that the air screw is completely analogous to a bolt working in a solid nut. This conception should be discarded, as it is calculated to lead its holder into all sorts of difficulties. A third fallacy is that the thrust is always the same for a given speed, whether the aeroplane is moving or stationary. I will endeavour to dispose of these ideas and replace them by others more compatible with experimental facts.

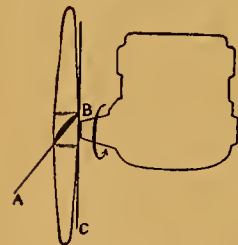


Fig. 1.

Disregarding, for the time being, the idea of the pitch of an air screw, let us suppose we have one fixed to a stationary engine, as shown in fig. 1. The speed at which this screw is driven is to remain constant, and therefore the power it absorbs must be proportional to the volume of air dealt with. This

volume, in turn, depends upon the width of the screw blade and upon its angle of attack. The former of these two is constant, and may accordingly be dismissed from the consideration. We thus get, *ceteris paribus*—power required for driving the screw is determined by the angle of attack.

If the screw is held, as in fig. 1, so that it can only rotate, the angle of attack is clearly the angle which the working face of the blade makes with the plane of rotation, namely, the angle  $ABC$ . In these circumstances we will suppose that the engine, at full power, rotates the screw at 1,200 revolutions per minute.

### Speed and Thrust.

Now let the same screw be fitted to a moving aeroplane. In these circumstances any point on the screw, which in the conditions of fig. 1 described a circle, will now have a forward component added, and will consequently describe a "corkscrew," as shown in section in fig. 2. It will at once be perceived that the

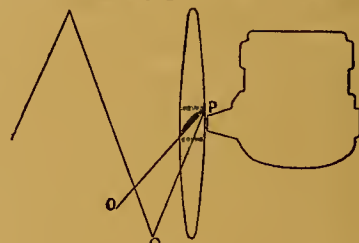


Fig. 2.

angle of attack, which is now the angle  $OPQ$ , is considerably smaller than it was in the first case, and, further, that the greater the forward speed of the aeroplane, and the quicker the thread, as it were, of the corkscrew path, the smaller is the angle of attack.

The smaller the angle of attack, the less the volume of air accelerated backwards, and, in consequence, the less is the power that is absorbed, and the less is the total thrust available.

As a consequence, the load imposed by the screw on the engine will diminish as the aeroplane speed increases, hence with a given throttle opening the engine will revolve faster, say up to 1,500 r.p.m., thus promoting in its turn a slightly increased thrust, since, whilst the air dealt with will not be increased in volume, it will be accelerated backwards more rapidly.

The greater the forward speed of the aeroplane, the less is the thrust given by the propeller.

### Climbing.

When an aeroplane climbs, use is made by the pilot of the engine power which is surplus to that required for flying the machine horizontally at its minimum speed. Suppose that the machine has a speed range of 40-60 m.p.h., and that at the maximum it absorbs 100 h.p., and at the minimum 75 h.p. If whilst keeping the throttle fully open, the pilot sets his planes



**Flying Facts and Theories.—**

so that the forward speed is restricted to 40 m.p.h., it is evident that he will have 25 h.p. to apply to climbing, or to a vertical component of motion.

By reducing the speed of the aeroplane, however, he increases the angle of attack of the screw, consequently as he climbs the engine speed will immediately fall off, and, thanks to the unforgivable inflexibility of the petrol engine, the power output will fall off in proportion. The horse-power he will have in hand will thus also be diminished.

This is where a change-speed gear would come in very handy, as it would enable the screw-speed to be kept constant and the engine speed to be increased. Few people seem to realise that this is the case, for they seem to imagine that in the matter of climbing hills an aeroplane is not subject to the same physical laws as apply to other automobiles. The reason why a change-speed gear is not used is that it would add a good deal of weight, at the same time causing some loss in propulsive efficiency; so that the net gain, if it were possible to get one at all, would be minute. A much more promising device is a variable pitch screw, which in climbing could be set at such a blade angle that the engine would be enabled to give its full revs. and full power. By such a means the climb could be materially improved. Present conditions are, however, more easily served by simply putting in a big horse-power in relation to the weight of the aeroplane, and thus the required speed of climb is obtained. It is rather like using a 20 h.p. single-gear twin so as to be able to climb anything with a sidecar, but it works very effectually.

**Efficiency and Thrust.**

The power absorbed by a screw is expended in two ways, first by pushing the slip-stream backwards, second by pushing (or pulling) the aeroplane forward. One cannot, however, measure its efficiency simply by considering its thrust; the thing that matters is the "advance per revolution."

Just as the thrust varies in different aeroplane conditions, so does the air-screw efficiency, only, instead of decreasing with increase of forward aeroplane speed, it goes up. And it is for this reason that with a reduction in the angle of attack comes not only a reduction in the head resistance of the blade in its flight path, but also an increase in the proportion of the lift component as compared with the drag component. This is due to the fact that the screw blade

section is shaped and designed to give its greatest efficiency at small angles of attack.

When a plane moves through the air it gives rise to a pressure the intensity of which is determined by the speed, and the weight of air dealt with, and the direction of which is dependent upon the shape of the plane section.

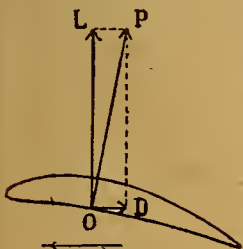


Fig. 3.

In fig. 3,  $OP$  is the resultant pressure caused by the reaction of the air. By the parallelogram of forces it is split up into two components  $OD$ , called the "drag," and  $OL$  called the "lift." The ratio of the value of  $OL$  to  $OD$  is called the lift-

drag ratio. In the case of a propeller-blade, the drag force lies in the plane of rotation, and the lift force is at right angles to it.

The faster the aeroplane travels, therefore, the greater does the screw efficiency become. On modern machines it sometimes attains a value as high as 85%, but when the aeroplane climbs this will be reduced probably to 60% or thereabouts.

It is by reason of the above facts that high speed aeroplanes are fitted with small diameter screws, direct driven, whilst slower weight-carrying machines have large screws geared down from the engine. Only by reducing the diameter in the former case can the best angle of attack be obtained when the engine is "all out" and the machine travelling at its highest speed. If the blade angle were kept suitably big and the diameter increased the load on the engine would be such that it could never give its full horse-power or attain its full revolutions.

**The Pitch of an Air Screw.**

In practice it is found that for best efficiency the pitch of an air screw should be about equal to its diameter. A rather interesting fact in connection with the screw is that the slip-stream, in addition to having a

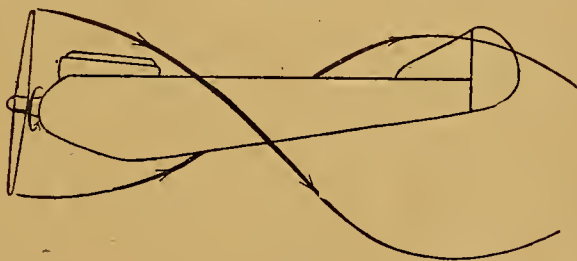


Fig. 4.

bodily backward motion, has also a "whirling" action, as shown in a greatly exaggerated form in fig. 4. In some aeroplanes it has been found desirable (for reasons which I hope to discuss in a later article) to tilt the line of thrust; this means that the plane of rotation of the screw is, as indicated in the sketch, not quite at right angles to the longitudinal axis of the machine. The fixed vertical fin of the tail, which for purposes of stability is placed on the upper side of the frame, is therefore not uniformly affected by the slip-stream. In the figure it is seen to lie so that the slip-stream which strikes it is moving partially across it. The result of this will be that the machine, when the screw is running, has a tendency to turn to the right, and this tendency will vary according to the speed of the screw and the speed of the aeroplane. In order to overcome it the rudder must accordingly be slightly set over so as to offer a counteracting turning tendency. When, on such a machine, the engine is switched off for a glide, the pilot will also have to make the necessary correction with his rudder, or else he will find himself suddenly turning to the left.

**GOODS MADE IN GERMANY.**

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.



# Current Chat



## Times to Light Lamps.

GREENWICH TIME.

Dec. 20th	...	4.21 p.m.
" 22nd	...	4.22 "
" 24th	...	4.23 "
" 26th	...	4.24 "

## Our Christmas Number.

Christmas for the last three years has been a very different function from that to which Englishmen have been accustomed. Instead of being by home firesides they are far from home, and often without both fire and the place to put it; but we have thought it best to maintain some sort of a Christmas atmosphere under protection of the "Blue Cover," even if most of our readers will have no more than memories that they may call their Christmas. If only we can help such memories we shall be content, and hence our special justification for a "special number."

## Special Features.

Plenty of light and seasonable reading will be found in this week's issue, and most of it has a motor cycling atmosphere. We can do no better than commend these stories to our readers, with an expression of the genuine wish that next year we may be all at home together to see the season through.

## Hun Motor Industry.

The *Daily Mail* says: "The German motor industry proposes to raise its prices 25% on all future Government work. The newspapers protest, saying that swollen dividends, in many cases as high as 30%, prove that motor manufacturers are doing very well out of the war. The manufacturers retort that they must provide against future 'idleness' when there will not be work enough for their vastly expanded works; also against the 40% of their pre-war output which went abroad."

"The *Frankfort Gazette* advises the industry to see to it that motor vehicles henceforth serve as regular means of long-distance transportation for both passengers and freight. This would utilise thousands of the lorries now in Army use and call for regular supplies in the future."

## Illuminated Speedometers.

A correspondent writes: "With reference to 'luminous speedometers' in a recent issue of *The Motor Cycle*, I illuminated my speedometer myself with a bottle of luminous paint, and from then till now it has given every satisfaction. The luminous paint was bought and put on fully six months ago. I should like to recommend it to all your readers."

## The A.C.U.M.M.D.

*The Motor Cycle* in one week dealt with thirty applications for enrolment in the Auto Cycle Union Motor Messenger Detachment, and forms were sent to all enquirers who resided in the London district—the only district from which recruits are drawn. All vacancies have now been filled up, and a waiting list has been instituted.

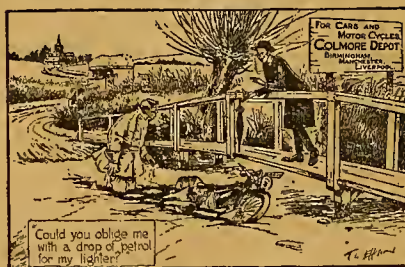
The first messenger was despatched by Major T. W. Loughborough, secretary of the Auto Cycle Union, from the Central Telegraph Office at noon on Monday last, the 17th inst.

## Fuel Prospects.

The eighth ordinary general meeting of shareholders in the Anglo-Persian Oil Co., Ltd., was held recently, and, judging from the chairman's report, the fuel situation in the future may turn out, after all, to be not quite so desperate as most of us expect. The report was

## YE SEASON OF GOODWILL.

(Not having the best of times—but always willing to help others.)



The Colmore Depot is again this year sending out a greeting card of a humorous nature, the petrol scarcity and coal-gas being the artist's subjects.

## Special Features.

### A RACE WITH RUIN.

### MECHANICS FOR THE MOTOR CYCLIST.

### COAL GAS IN PRACTICE.

most optimistic in its tone, and the speaker's optimism, even making allowance for his wish being father to his words, certainly seemed to have a fair foundation of facts on which to rest.

## The Oil Question in Persia.

The company is even now developing and extending its oil fields in Persia, and the chairman felt justified in prophesying that after the war the company would be in a position to produce nearly twice as much petrol as the United Kingdom consumed in pre-war days. If this is the case, and as, of course, there will be other companies selling the precious spirit, it would almost seem that our post-war wants will be fully satisfied.

## The Finances of the Company.

The largest shareholder in this company is, of course, the British Government, whose representative holds a seat on the board of directors, and some of the people who think even yet that a Government may contain wise men some day are of opinion this augurs well for the future of the company as a public benefactor. The company has also bought up the British Petroleum Co., Ltd., the Homelight Oil Co., Ltd., and the Petroleum Steamship Co., Ltd.—acquisitions, in fact, of highly organised transport services.

## German Petrol Companies in England.

All these companies were of German origin and controlled the inland distribution of most of our petrol in the case of the first two, while the last named owned an extensive fleet of tank steamers. Incidentally we have been informed that the British Petroleum Co. has relinquished its share in the motor spirit trade of the U.K. temporarily. Whether this means we are to be subjected to German control over some of our petrol distribution after the war, however, we cannot say.



### Closing of Triumph Depots.

The Triumph Cycle Co., Ltd., are closing their Manchester and Leeds depots at the end of this month, owing to the continued depletion of their staff.

### Motor Cycle Clubhouse Change.

Brookdale Hall, Catford, S.E., headquarters of the Brookdale M.C.C., and one time home of the Catford Cycling Club, is partly occupied by the local Food Control Committee. The large motor cycle garage is serving as a billiard room for club members for the duration. A roll of honour of the members is displayed in the clubroom. One (Capt. Bedford, the Hazlewood competition rider) was a recent visitor. Before the war he was manager of the Hazlewood London depot, and a successful competition rider.

### Mixed Travelling.

Of a party of motor cyclists, members of the Woolwich, etc., clubs, at a Seven-oaks road rendezvous at the week-end, three arrived on motor cycles, three (including a well-known competition rider) on pedal cycles, two per motor 'bus, and two had tramped down from South London.

### A £1,000 Prize for Inventors.

£1,000 is the sum the Automobile Executive Committee have decided to offer as a prize for the best invention devising a method of using coal gas as a propellant of motor cars and motor cycles. A small sub-committee has been formed to prepare the conditions, which will be announced in due course, and they will be glad to consider suggestions, which should be addressed to the Secretary, A.A. and M.U., Fanum House, Whitcomb Street, London, W.C.2, and marked "Coal Gas."

### Training of Boys for Mechanical Units.

Our leader of December 6th appealing for names of boys willing to train for mechanical units has brought a very wide response from boys of all stations, ranging from the incipient munition worker to the public school boy. All names and addresses are being filed, and as vacancies occur in an applicant's district he will be notified. Many boys appear to have regarded our article as an appeal for despatch riders, but really it was, of course, nothing of the kind.

### The Tradesmen's Share of the Business.

The response from tradesmen has been singularly disappointing, and very few, indeed, have shown their willingness to help in this attempt at preparing men for our mechanical services.

### Petrol Wastage.

A reader informs us that he recently laid aside his motor cycle owing to military duties, leaving fully half a gallon of petrol in the tank. Some weeks later, on returning home, he took out the machine with the intention of making a short trip, and was surprised to find the tank quite empty. Leakage, which probably had been going on for weeks while the machine was in use, was found to exist at several points, and this should serve as a reminder that to eliminate all danger of leakage, all petrol fittings should periodically be tested by mixing a little oil with the petrol.

### Prices of English Machines in France.

A French reader sends us a recent cutting from the *Matin* in which a 1917 B.S.A. combination is advertised for sale at 3,400 francs, equal to £136! Whether the combination is new or second-hand is not stated.

### The National Motor Cyclist Fuel Union.

At a meeting of delegates of the National Motor Cyclist Fuel Union, held at Birmingham recently, it was decided to establish local centres having territorial secretaries who shall conduct the business of the districts under their jurisdiction. A membership of 2,355 was reported among the towns represented. Mr. Cade (London) referred to the astounding growth of the Union, and pointed out that so important a body of men should not be content merely with the successful termination of their immediate objects, but should carry on as a national body after the war. The next meeting was fixed for Saturday, December 15th, at Derby.

### A Motor Cyclist to the Rescue.

One day last week a cob, the property of General Sir Edward Hutton, bolted in the main street of Chertsey, whilst Lady Hutton was engaged in the War Emergency Offices. It knocked over a milk cart, bolted through a flock of sheep, injuring several, mounted the pavement, and naturally caused considerable consternation. It then bolted out of the town, but was eventually caught about two miles away. A motor cyclist who had followed the runaway for the whole distance figured prominently in its capture.

### Better than Castrol?

At the request of the National War Savings Committee, Sir Charles Wakefield addressed a meeting in Trafalgar Square on the 3rd inst. In the course of his speech Sir Charles said: "We all eat too much, both for health and pocket. When

busy in the City I frequently content myself with three glasses of hot water for luncheon, and have found it an excellent lubrication." This observation appealed to an Irish hearer's sense of humour, and a voice with a rich brogue called out from the crowd, "How much whisky do you put with it?" Sir Charles's reply was apt. "None, my friend, whisky is too dear!" Sir Charles concluded by stating that he would give 200 £1 War Savings Certificates to the wounded Tommies among the crowd as a Christmas box. The news spread round, however, and it was found that the number who gathered exceeded 200, and immediately Sir Charles procured another fifty, to the entire satisfaction of the wounded men, who accorded him hearty cheers.

Before leaving the Square Sir Charles himself purchased £5,000 worth of War Bonds.

### Such Deadly Oratory!

When Sir Charles, standing on the Tank, commenced his speech there were only five wounded soldiers present. He spoke for twenty minutes, at the end of which there were 300 wounded surrounding the Tank (presumably all soldiers)!

### Petrol used for Business Purposes.

Two cases have come to our notice recently, in which readers have been granted free-of-duty motor spirit licences. It is not generally known that these licences are issued only for the purpose of purchasing petrol for vehicles used solely for industrial purposes, which are exempt from the local taxation licence.

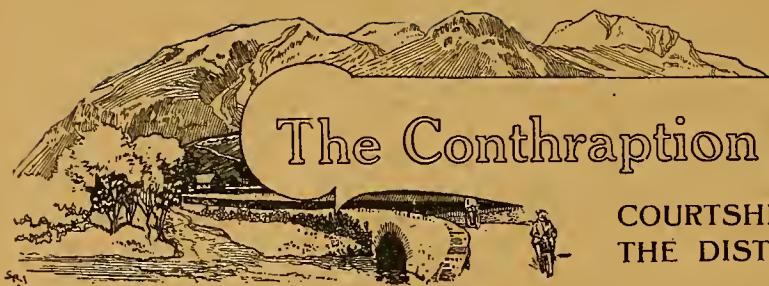
In both cases our correspondents' motor cycles were used solely for business purposes, but as they had paid the local taxation licence in respect of them they have been compelled to remit the duty on the petrol purchased.

A sidecarrier which is constructed solely for the transport of goods and merchandise, being exempted from the local taxation licence, entitles its owner to a free-of-duty motor spirit licence.



A French rider at the back of the lines in the Argonne district. The mount is a Triumph, many of which are used in the French Army, frequently with light wicker sidecars attached.





## The Conthraction and the Darlint.

### COURTSHIP AND A SIDECAR IN THE DISTHRESFUL COUNTRY.

"**S**HE was the finest creathure in all Ballyhooly, and never deserved to be brought to such a pass," said old man Murphy, bitterly, "and it was all because of one o' them inventions of the devil."

He pointed to my sidecar outfit which stood outside the dilapidated dram shop. He did not wave his hand contemptuously—seeing that for the last half-hour he had been imbibing a fiery potion at my expense—but with a carefully calculated neutrality.

It needed but a little more fuel to get the story going, to bend his neutrality to a bias in my direction, temporarily at any rate.

"It started this way," said Murphy, as he filled up the stump of a black clay pipe, and took another drink at the awful concoction. "Sheila was the belle of all Ballyhooly. Such eyes she had as never was, and hair as black as night, and a voice that shook ye heartstrings, like no melody that ever was harped. She had ivery man at her feet, but it was Barney Brian and Pathrick O'Neil that fought it out to the end.

"It was a fine dimpsy mornin' that Pathrick brought his conthraction home, and up to that time Pathrick deserved to be treated handsome, for never did he taste the bottle betwixt and betwane, and a bonny couple the two would 'ave made.

"So it happened that Sheila met Pathrick comin' along.

"Why, faith, 'tis my darlint,' sez he, drawing up with a clatter and a banging that brought all Ballyhooly out to see the sight. 'Aré ye comin' along wid me?' And Sheila took hold and planted herself in that crazy cradle stuck on the side of the bicycle. 'Ah! my old friend Murphy,' sez Pathrick, when he saw me obsarving them; 'come and sit yerself on the bridge at the back.'

"Never in my life,' sez I; 'I pray to the blessed saints to be delivered from such a misfortune.' O' course the lad had a merry heart, an' only meant to be agreeable and complaisant.

"Pathrick, dear,' said Sheila; 'just tend to my grave if——' and the next minute I jumped for my life, for all of a sudden I heard a pistol shot under the darlint's nose. She screamed a little, then laughed. With a banging like a Gatlin' gun they moved up just a yard or so, then stopped again, but not on purpose, judging by Pathrick's unpeaceable language.

"What part of the blessed counthry are ye off to explore, Pathrick?' sez I, walking up to him innocent as a lamb. But devil a word said he, scowling like thunder.

"But Sheila turned to me, showing the weest bit o' twinkle in her eyes, then winked deliberately.

"Patsey Moor, Murphy,' sez she, with a face as solemn as yer riverence's is at this minute.

"Then may the blessed Virgin follow ye,' sez I, 'and bring ye safely home agin.'

"Never agin will I pass a benediction in connection with such a divilish invention, for who should pass that very minute but Barney Brian in as dinky a jaunting car as ever was. He stopped and took stock of the proceedings, an' 'avin' a knowledge o' the lay of the land, so to speak, laughed at the show Pathrick was making, as he wound his legs round and round an' gettin' no forrarder. The devil hisself was in the engine seemingly.

"Take it easy, Pathrick,' sez he, 'ye have no need to exert yerself so much, ye have all the day afore ye.'

"It being a blithish day, Pat took on a complexion like a lobster just out of the pot, Barney's banter pretty near puttin' an end to the peace av the mornin'. But Barney went on, after taking out a bottle and havin' a good long pull, 'Ye seem to have a moighty predelection for this particular neighbourhood.'

"Of course, Pathrick flared up, an' gave him his change accordin', and in his temper he gives an extra twist to the pedal which set the engine off agin like a gun, frightening Barney's cob to distraction.

#### Providence and the Whisky Bottle.

"Off went the horse as if all the demons in hell were at its heels, Barney's bottle flying across, catching ye 'umble a thwack on the nose, which I rickollect to this day.

"But it was Providence in the way, for the bottle niver broke, and I took a wee pull to calm my pulse.

"Then off went Pathrick after him down the narrow road that led to the moor. So, thinks I, I'm goin' along that road, for somethin' moight occur worth obsarving. In the distance I saw the jauntin' car leapin' along, with the conthraction just behind, and a divil av a noise there was. Barney Brian stood up wavin' his arms, and shouting for Pathrick to stop his motor, for it was plain to observe his cob was out av hand. But Pat kept on, an' the faster he went the faster went the cob.

"With a whizz and a rattle they passed old Semus McLaugham's cot, an' a moighty narrow squeak it was at the bend. The wheel av the jauntin' car must av lifted at least a foot, and when the conthraction, roarin' behind like twenty traction engines in one, wint round the corner up goes the wheel of the basket too. Sheila squealed and grabbed the sides, an' me heart wint into me mouth. But the wheel dropped agin, an' off they wint as if ten thousand devils were after them, an' niver a sight of 'em I obsarved till the sun were meltin' in the west.



**The Contraption and the Darlint.—**

"Havin' a wee dhrop wid me, I walked on and made a day of it, for a world o' good it does a man to ponder an' take a philosophical look at things. Keepin' the nose to the grindstone is' not good for men or beasts.

"Well, about five, mebbe six, miles from Ballyhooly I sat on the sod an' just took in the grandeur o' the day, an' must a' fell asleep. I was awakened by the voice of me darlint niece—I didn't tell ye riverence that Sheila is me sister's only child.

"Pat, Pat," sez she, and I seemed to hear the voice like as 'twas in a dream.

"Pat, Pat."

"I jumps up startled, an' there was the darlint all alone an' not another soul about.

"The saints alive, me darlint," sez I, 'where's Pathrick and the contraption, and Barney?' thinkin' somethin' exthrdinary had 'appened.

"Then her black eyes flashed as never had I seen 'em, and she stamped her foot in temper.

"Oh, the beast," sez she. 'Never agin will I speak to him.' Then she starts to cry all of a suddint.

**An Old Man and a Darlint.**

"Sheila, me darlint," sez I, 'tell ye old uncle all about it,' an' I put my arm round her waist to steady her, an' would have kissed her like as not, as I have done many the time when she was a wee bairn. But all of a suddint she jerks herself away.

"Oh!" sez she, 'there'll be murder done; niver, niver again will I go with that Pathrick O'Neil.'

"It's by the mercy o' the saints that I'm alive at all," she went on, all white and scared. 'Niver did I have such a drive. Pathrick wouldn't stop when I asked him, and the din of the engine frightened Brian's horse. The faster Pathrick went the faster went that poor scared cob. We raced on till we reached a little rise, and when we got to the top we saw no sign of Brian; he had disappeared as if the airth had swallowed him. Then down the hill we rattled, and just as we reached the bottom that divil Brian rushes out with a hurdle, dhrops it in the road, and over it we goes. The next minit I was flat in a bunch of heather, and Pat full length in the road, and Barney Brian laughing as if his sides would break. But Pathrick jumps up in a flash and rushed at Brian like a bull. Then I turned on my heel and left them. I left them to it, and they may be fighting this very minit.'

"Suddenly she turned pale like, and says, 'I think I'll just take a look back after all, for Brian is a

terrible man when he 'as dhink on him, and I'm feared for Pat, uncle.'

"How far ahead did the accident 'appen?' sez I.

"Three or four miles on," sez she.

"And has my darlint tramped all those four blessed miles, and foive miles back it is to home?"

"She nodded; but was more concerned about Pathrick than the long walk which lay before her.

"But ye're not going back, darlint?" sez I.

"I am," said she, flashing.

"And the next minute she grasps my arm and pointed in the distance, where there was a sight to make the saints in Heaven laugh.

"But Sheila, she never laughed.

"In the distance the procession came. First, the jauntin' car, with Barney Brian driving as slow as a funeral, his face covered with blood. Then came the contraption, which was being hauled along with a rope. There niver looked two bigger ragamuffins. Pathrick, he waved an empty bottle; but, give the

boy his due, he threw it away when he caught sight of us watchin' them, just missing Barney's head by the skin of his teeth.

"Whoa, whoa!" he shouts, jumping off. 'Here's my darlint Sheila and my old friend Murphy.'

"But Sheila, she never smiled.

"For why did ye forsake me, Sheila?" sez he, coming close to her. It was plain to see that he had been

takin' a wee dhrop betwixt and betwane, or he'd niver have put his arm round Sheila.

"She turned like lightning, and fetched Pat a moighty whizz on the cheek, sounding for all the world like the bang of an old beaver's tail on the water.

"Pat turns mazed like, more stunned in surprise than aught else, and mad as a hatter 'cause Brian sat laughin' at the pretty scene.

"Oh ye vixen," sez he, looking silly and rubbing his cheek.

"Then he turns all o' a suddint and makes a dart for Sheila.

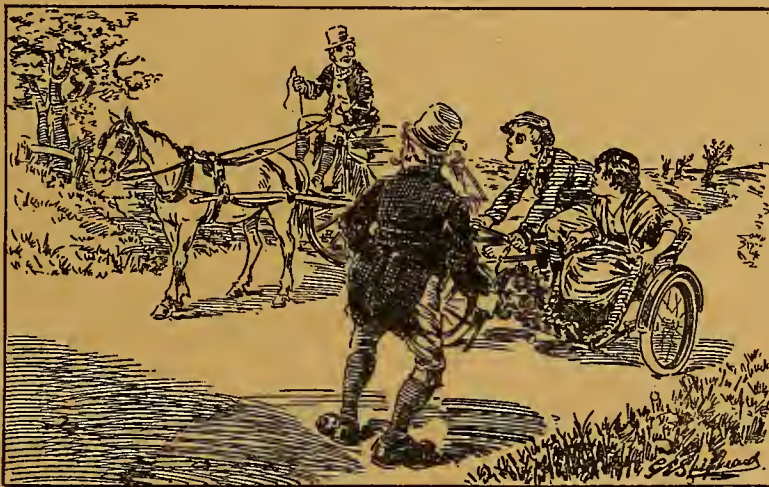
"But ye are comin'," sez he.

"And away like a flash runs Sheila down the road, an' I afther her. Howiver, Pathrick was wise enough to see she meant what she sez, and he gits on his contraption an' advises Brian to drive on.

"And that's how we came to Ballyhooly.

**How they came Home to Ballyhooly.**

"Brian caught us up in his jauntin' car, and kept the procession just behind us. All Ballyhooly was out that evenin', and poor Sheila and me headed that



"Take it aisy, Pathrick," sez he."



### The Contraption and the Darlint.—

fool circus, there being no help for it. She hung her head, and what girl wouldn't have done with all the village out laughing? There was Barney grinning like a Cheshire cat, and Pathrick sitting glum as Satan on his contraption in the rear; it was enough to make a praist laugh. What a sight it must a been! An' that's how we come home to Ballyhooly.

"Poor Pathrick, he has lost the swatest darlint in all this disthresful counthry, but never would that have happened if the crazy hot-headed food hadn't bought the divilish contraption to disthtract the peace of the counthry side."

\* \* \* \* \*

My friend Murphy waved his hand towards my sidecar in open contempt, now that he had imbibed the potion I had provided. The incident seemed to sit heavily upon him—a disconsolate tear-stained, broken-hearted Sheila, the darling of his old age, to be left a lonely spinster all her life, all because of a sidecar. In this strain he wandered on.

Suddenly the air was rent with the frightful racket of an unsilenced single-cylinder, the ear-splitting sound becoming more and more violent as it approached. Then up jumped Murphy toppling the table over in his excitement to get to the door.

"The saints be praised," he shouted, "if it isn't that blessed Pat and Sheila!"

I walked to the door and beheld an ancient sidecar occupied by an Irish lass as bonny as Murphy had painted her, her eyes dancing roguishly as she beheld her old uncle. The driver slackened down.

"Me old friend, Murphy," he shouted, "are ye comin' along on the carrier?"

"Faith, no," said the old man, his face beaming, "but may the blessed saints bring"—then he stopped.

"Git off wid ye," he shouted, remembering the result of his last benediction. "Git off wid ye, ye vagobands."

He turned slowly back into the dram shop, laughing and rubbing his hands.

"Will ye rivirince ha' a wee dhrop wid me?"

## THE POLICE AGAIN!

IT seems a most extraordinary thing that when any new Order comes out affecting motoring the police open the ball with a series of blunders one could hardly have thought conceivable. In 1916, when the Char-à-banc Order first came into force, unfortunate motorists were held up in numerous parts of the country and threatened with summonses, the police entirely forgetting the fact that the Order referred solely to the chars-à-bancs and not to privately owned motor cars and motor cycles.

Now the Motor Restriction Order has come into force the same sort of thing is going on. It is quite obvious that the possession of a motor spirit licence is not, strictly speaking, necessary for the use of a motor vehicle; for instance, anyone who has a stock of petrol, even though he has no licence, may use his motor vehicle for the purposes mentioned in the Order; e.g., if he has to go to a railway station and there is no other means of conveyance he may use his motor cycle, or if a member of his household is taken suddenly ill he may use his sidecar combination to fetch the doctor, and no action can be taken against him for such use of motor spirit, whether or not he possesses a motor spirit licence.

The other day a correspondent, using his motor vehicle for one of the purposes permitted by the Order, applied for a petrol licence, and in making his application he had, of course, to state the amount of petrol he had in stock. The Petrol Controller's Department regretted that they could not grant the licence at the moment, as he had enough petrol to go on with, but told him that if he applied in the following month a licence would be issued to him. He has therefore continued to use the machine, with the result that the interfering police in his neighbourhood have threatened to summon him for driving a motor cycle without a petrol licence.

Here is another glaring instance of police muddling. One of our correspondents has been granted a full-duty licence for the purpose of going to his farm, ten miles away from any railway station, for the

purpose of fetching eggs, butter, poultry, etc. On a recent Sunday the motor cyclist went with his wife to the farm with the object of fetching various goods. The next morning the local constable called on him and asked him why he used his motor cycle and sidecar on Sunday. The result of this is that our reader has received a summons, which states that he "did unlawfully use or cause or permit to be used petrol or petrol substitute for the driving of a motor vehicle for purposes other than those permitted by the Motor Spirit Restriction Order, 1917." We may mention that the attention of the Auto Cycle Union has been called to the matter, and that our correspondent's case will be taken up by this body.

We are aware that this is not the only case of police muddling, and would not be surprised to hear that the Petrol Controller's Department have had several of these cases brought to their notice.

### NOT TOO OLD AT EIGHTY.

Mr. E. Blackburn, of Stockton-on-Tees, who, though 82 years of age last August and weighing 15 st., is an enthusiastic rider of a Radco two-stroke.





## MILITARY NOTES.

## Over the Turkish Mountains. Germany's Output of Aeroplanes.

## IN THE GREAT TANK ATTACK.

ERIC V. O. WILLIAMS, who took part in the recent advance at Cambrai, writes saying that "This last affair was 'great,' although we went with hardly any sleep for eight days. It was a treat to see the Hun prisoners coming in, one with shaving lather still on his face; also to see that the papers gave a glowing account of the Tank Corps. Still, they could not flatter them too much this time. I am quite happy and enjoy the work very much, though not sufficiently to make me hesitate about returning to civil life when the opportunity occurs."



Eric V. O. Williams, of the Tank Corps. He was in the recent great Tank attack at Cambrai.

## OVER THE TURKISH MOUNTAINS.

THE following extracts are from an interesting letter received from L-Cpl. Jack Summers, now in Mesopotamia:

"We are still going strong, and hope to have huffed Johnny completely by Christmas this year. It is now 'pukker' fighting weather here, getting quite cool—in fact, the thermometer seldom exceeds 100° in the shade these days. Nights and early mornings are quite chilly. We have been over these mountains several times during the summer to the Russians, and, owing to the intense heat, boiling with the Rolls and drying up with the cycles was the order of the day. The highest point of the trip was 2,849 feet, so you can imagine that low gear was more in evidence than top. We manage to find good descents occasionally. Some weeks ago we managed to do eleven miles in just under 15m. (and no gentleman (?) in blue). This was accomplished by the Rolls, the 'Duggies' being left at home on this occasion, the pace being rather too warm for them. It is, of course, unnecessary to add that tracks like this are few and far between. As a contrast to this, it frequently takes us one hour to do three miles."



L.-Cpl. J. Summers, L.A.M.B.

"We were very pleased to notice in the 'Blue 'Un' that at least one enterprising English manufacturer has adopted 28in. wheels (Russian

military model, I believe). They would be absolutely 'it' out here."

"Am enclosing a photograph of myself taken just after returning from a brush with Johnny. (It is mostly dirt on my face, not sunburn.)"

"The Battery join me in wishing you and your popular paper (which, thanks to you, we receive regularly) a Happy Christmas and a cheery New Year."

## GERMANY'S OUTPUT OF AEROPLANES.

THE most recent estimation of Germany's strength in aeroplanes, according to Reuter, is that she possesses 275 aeroplane squadrons, comprising 2,500 machines. These comprise 100 artillery spotter, 80 scout, 23 bombing, 40 chaser, and 30 battleplane squadrons, the last for the protection of the bombers.

The German output of aeroplanes is reported to be rapidly increasing.



A greeting card received by the Editor from the boys of the 3rd Army Signal Co., France.

## THE AIR FORCE UNIFORM.

ACCORDING to a statement by Major Baird in Parliament on November 22nd, it is definitely decided that the new Air Force shall have a characteristic uniform. Rumours, of course, have been prevalent on this topic for some months. Whether a change is to be made in the colour of the uniform is not yet decided, but it is settled that no change will be compulsory until existing uniforms have had ample time to wear out—not such a very tedious procedure. The latest rumour has it that the uniform will be grey without the Sam Browne belt.

## WITH THE A.S.C., M.T.

L.-CPL. FRANK A. HARDY, A.S.C., M.T., writes in a cheerful strain from France. He has now been placed in charge of the motor cycle

store of the convoy with which he went out, and has as his assistant Parker (known as the pot-hunter of Brooklands days). They are responsible, with help from odd men, for the cleaning and keeping in running order all the motor cycles. Like thousands of other motor cyclists, Hardy is looking forward to joyful days

when the "straife" is over, and when one will be able to ride one's mount again.



L.-Cpl. Frank Hardy A.S.C., M.T.

## DISABLED OFFICERS AND NATIONAL SERVICE.

IT was asked in the House of Commons last week whether, in view of the number of officers unfit for general service at present in this country, facilities might be given to such officers to be placed on the National Reserve, without pay, so that they could be employed in a civilian capacity on work of national importance.

## MENTIONED IN DESPATCHES.

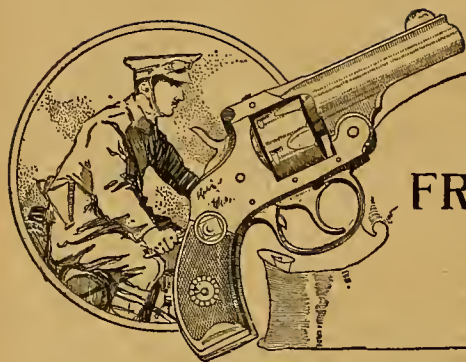
IN the list recently published of those mentioned in despatches by the Commander-in-Chief there appears the name of Maj. (Temp. Lt.-Col.) A. E. Davidson, D.S.O., R.E., a Vice-president of the A.C.U., and an officer who, as most of our readers are aware, has done an invaluable amount of good work for the A.C.U. and the motor cycle movement in general.

Also mentioned in the same list is Brevet-Colonel A. B. R. Hildebrand, D.S.O., R.E., an officer who in the very early days was associated with the use of motor cycles in the Army. He had the care of the motor cyclist corporals (R.E.) who went out with the first Expeditionary Force, and also looked after the training of the motor cyclists (R.E., Special Reserve) during the manoeuvres of 1914.



Cpl. Artificer N. Smith, with the B.E.F. in Italy, sends us Christmas Greetings and encloses a photograph of himself which is reproduced above





## LEAVES FROM A DESPATCH RIDER'S NOTEBOOK.



### SOME MOTOR CYCLE EXPERIENCES IN FRANCE.

**W**HY does H.Q. have to wait till the 'witching hour of night to issue orders? The only satisfaction the motor despatch rider has about the undeniable fact is that he has the pleasure of waking up the officer to whom the orders are addressed, and it may be several other officers before he finds the right one. It is wonderful how extremely unpleasant pleasant men can be when wakened up at some ungodly hour by a motor despatch rider with orders which would possibly have done quite as well at breakfast time.

"What d'you want; who the (bad word) are you?" says Major —, when I wake him. "Motor cycle despatch rider," I invariably reply; "I've brought orders." "Put 'em down somewhere," then says he. "I've got to take the envelope back," I reply. "Then take it back," says he, warming up. "But it's got to be signed by you, sir," I insist. "Oh! . . . !!!" says he. Then he begins to knock things over feeling for his torch to find his matches. I produce mine, light his candle, and we hunt for a pencil (amongst the glasses and piles of men's censored and uncensored letters). At last it is found, and he writes something on the envelope, which might be Queen Elizabeth, Blue Beard, or Deadwood Dick. It satisfies H.Q., so it satisfies me. That is the regular proceeding I have with that Major, who looks at me as though I were bringing him his death warrant, and as though I had some influence upon H.Q. which resulted in orders being issued at this midnight hour. I am sure he holds me in some way responsible.

#### The Sub's Welcome.

There is a young lieutenant to whom I have to go as well. His language is not that of a Sunday-school teacher when he is awakened from his beauty sleep. One of the other motor cycle orderlies is rather afraid of him. His usually immaculate hair (that is, the officer's hair) stands on end—owing to the bedclothes really, but it might be put down as rage. His two front false teeth are laid amongst the cigarettes on an ammunition box by the side of his bed, and this makes him look fiercer

(being without the teeth, I mean, not having them on the ammunition box). He begins to curse all the staff and everyone who wears a red hat throughout the British Army: he curses the war in general, every German born or unborn, every motor cycle and the man who rides it after dark. In fact, he is an artist, and I have a shrewd suspicion his father must be a clergyman, for the sons are often taken that way. Yet, when I bring orders to him in the daytime, when his hair is laid flat and bright with some of the hair-oil his servant has kindly left him, he is another man—in fact, quite what you would call "the gent."

#### Long-eared Cuckoos.

"Is it you," he says, "who falls over my tent ropes and wakes me up at an unearthly hour with Divisional Orders?" I plead guilty. "Well!" he says; "do you think we should lose the war if I were informed at a gentlemanly hour that that brown mule, marked 223 on near fore, was lost, and that more attention should be paid to saluting?" I grin, and in effect say, "Can the Ethiopian change his colour or the leopard change his spots?" I do not know that it particularly well conveys my position of being unable to alter things, but I have always wanted to quote that sentence. It is scriptural, and it sounds well if said deliberately. As a sort of recompense he begs a drop of petrol to clean the peak of his cap—it requires it!

If only officers could obtain leave to get new caps when their old ones got greasy there would be none left. They might try it, for from what I have heard they have buried all their relations, which isn't economy if the war is going to last another five or six years. Of course, in this case they must transfer to another unit, and then they can begin all over again with the list.

When there is no moon these midnight trips are sometimes a strain upon the nerves. Of course we take it in turns going on at nights. If I am friendly with George when I turn in, I say, "Well, good night, old sport; hope you miss the long-eared cuckoos to-night." It may be as well to mention that the long-eared cuckoos are mules.



#### D.R.'s IN FRANCE.

A signal relay lorry accompanied by despatch riders. The scene is in a small village on the Western Front.



**Leaves from a Despatch Rider's Notebook.—**

George says if he suddenly finds himself mixed up with seventy mules going one way and three hundred singing infantry on the other side of the road going another way, it puts years on him. I cannot say I enjoy the situation much myself. Mules, infantry, darkness, and a motor cycle do not seem to blend somehow, especially if the road just there has those delightful little switchback surprises which are reminiscent of a bucking horse and better for the liver than the temper. George says that such a combination puts the tin hat on it and makes him hate the war. (Query: Does he love it at times other than this?) The mule may be a sacred animal, but he is the *bête noire* (I have wanted to get that bit of French into this article, and it fits in rather well there, doesn't it?) of the motor cyclist.

I quite agree with the driver who once helped to pick me up after his two mules and I had had a Rugby "scrum." He said, "They're orkerd, wooden (bad word), are mules." I agreed *in toto* (that's Latin).

**Some Saluting and St. Vitus's Dance.**

Of course, the most awkward moment of all for a motor cyclist out here is when he is on an artillery track—that is, off the high road—and he has a shell-hole in front, a general on a prancing palfrey on the left, and his staff (also on prancing palfreys) on the right. He has got to jerk his head like a mandarin to the general on the left, keep his eye on the shell-hole in front and the aforementioned prancing palfreys on the right, and ride "in a smart and soldierly manner." I am sure my spine and eyes are permanently affected by this head-jerking business.

The proverb says a man cannot do two things at once. Of course, the ancient gentleman who wrote this definite statement did not anticipate motor cyclist

despatch riders. We very frequently have to do many things at once, not forgetting this saluting by head-jerking. I once knew a man with St. Vitus's dance who could have done it without effort—it came natural to him. With me I consider it is dangerous, and I shall be able to talk of the danger of losing my head—to which I have hundreds of times been exposed—when I get home on leave. (Note: This will probably be when the Americans start getting their leave, from the look of things.)

**Wounded Stripes and "Cushy" Jobs.**

They tell me, too, it is no use going home on leave unless you are wearing wounded stripes. No matter where, when, or how you were wounded, if you have a wounded stripe you are brave and a hero, and if you are not so decorated you are of little interest. Many motor cycle despatch riders have seen a road shelled to blazes, timed the shells and dashed past. (Do you remember Suicide Corner near Thiepval, and Whizz-bang Corner on the Somme? These are mere names now, and out of the fighting area, so no military secrets are divulged.) If they had got wounded, silly women at home would have lionised them and called them "a nero"; because they did not, by the same process of reasoning they are neither brave nor heroes.

Quite calmly and without depreciating our wonderful infantry (to whom I take off my hat), no one has put in harder work and got less recognition than artillery drivers and motor cyclist orderlies. During the pushes day and night, knee deep in filth, with shells dropping on the roads, and a combination of everything which is beastly and uncomfortable, they have still kept "carrying on." The limelight misses them, however, and they do not take cinematograph pictures at midnight, and there is rarely anyone there to see the sometimes superhuman efforts of these two classes of men. They have indeed *proved* themselves men.

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**SOME QUERIES.****GLEANINGS FROM UNPUBLISHED QUERIES.**

**I**T goes without saying that only a small percentage of the queries we receive are served up for publication, and among the many which do *not* find their way into print are always a few bright gems which prove a source of endless merriment to members of our Editorial staff. The man who omits his address and requests a reply by return, finally writing abusing postcards and demanding the return of the stamp he enclosed; the enthusiast who assures us that he has read the paper for eight years, and will we kindly inform him whether his  $3\frac{1}{2}$  h.p. Rudge is a two-stroke or a four-stroke—these are but satellites of some of the brighter bodies in the firmaments of absurdity.

Queries regarding routes do not, as a rule, lend themselves to any great depth of humour, and yet the man who asked for the route from Ramsgate to Margate was evidently more of a canny traveller than a humorist. The reply was—Ramsgate-Margate.

More than once we have received the query, "What does it cost to run a motor cycle?" We should say about a pound. This question, however, is more of a rational enquiry, coming as it obviously does from a non-motorist, than is the following from a man who

assures us of his long experience—"What do you think I should allow for depreciation with petrol at 3s. 6d. per gallon?"

**Gasbags.**

"How far would my petrol tank full of coal gas run me?" queries one bright youth. The reply rather depends upon circumstance. From the top of Kirkstone Pass it might run him to the bottom, but certainly not from the bottom to the top. Another enquiry is from a reader who wishes to charge a steel cylinder at about 200 lb. per square inch pressure by coupling it direct to a gas main! Yet another enterprising soul asks us if we will kindly put him "into communication with Mr. D. S. Cox, 6, Lansdowne Hill, West Norwood, S.E., maker of flexible gasbags."

A reader who has taken his engine adrift discovers "a thin steel washer inside the crank case. Will you kindly tell me where to replace it?" Perhaps the prize specimen of all our recent postbags is the innocent query of a certain fairly well established *firm of motor cycle manufacturers* who actually ask, "Is it possible to run a motor cycle engine on acetylene gas?"





## LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents. All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

### GOODS MADE IN GERMANY!

Sir,—We wonder what kind of person this Chas. S. Ives is. Perhaps he is a Conchy, or maybe a Bolo, or interested in the sale of Germhun productions; and what will he do with the amount of which he is depriving *The Motor Cycle* each week? Will he deposit it in the Dresdner Bank, or will he buy an extra copy of the *Cologne Gazette*?

However, to save *The Motor Cycle* from impending ruin and bankruptcy, we propose to order another copy each week, and trust this will prevent the closing down of your paper.

A. ATKINSON.

Sir,—I have read with great satisfaction in the issue of December 13th of your most interesting and excellent paper that Chas. S. Ives has given his newsagent notice to discontinue your paper. Knowing what a great paper shortage there is at present, it is most satisfactory that the weekly copy which has hitherto been wasted on Mr. Ives is now available for other and more worthy people. It is, perhaps, hard lines on the newsagent, but then fate has indeed dealt cruelly with him in the fact that he is Mr. Ives's newsagent.

Should Mr. Ives be the possessor of a motor cycle (and my sympathy is with the machine), when the time comes for him to sell it, would it not be better for him to advertise it in the *Berliner Tageblatt*, which ought to ensure his effecting a speedy sale?

Doubtless the *Berliner Tageblatt* would be highly honoured by such distinguished patronage.

C. A. HARRISON.

### A SPORTING CHALLENGE.

Sir,—A letter is published in your issue of December 6th from "Spectator" which leads me to conclude that that gentleman is talking "through his hat."

In the first place he entirely ignores the challenge thrown out, the details of which also appear to be unknown to other correspondents and readers.

The challenge was as follows: "The single-cylinder enthusiasts would find a course of twenty miles odd, finishing with a steep hill, also of their choice. Over this course their machine, pulling a touring sidecar with a passenger, would beat any twin-cylinder, no matter what capacity, similarly equipped."

The result is known, and is only what was expected. Now for further facts. The winning twin was privately owned, not by Mr. Brough, but by a friend of his. It was an ordinary 8 h.p. side-by-side valve J.A.P. engine of standard capacity

and make. Mr. Brough tuned and rode it for sheer sport.

As the only spectator who saw the two machines climb the hill, and with over twenty years' motor cycling experience behind me, I can say that the twin was at least 12 m.p.h. faster up the hill than the single, my estimate being 42.46 and 30.32 respectively.

From the time the twin passed me until I heard the single approaching was 150 seconds. It would then be about half a mile away, but for other reasons I was unable to go on timing, as I was not there for that purpose. The match was a fair and square test under ideal conditions.

Now every rider (obscure or otherwise) who has a machine he thinks can "lick creation" is sending in challenges.

These, of course, are ignored, but after the war is over and we return to happier times no doubt these sporting events will occur with greater frequency.

Coventry. BE SPORTSMEN.

### EXPERIMENTAL AERO ENGINES.

Sir,—I notice in the article on "Aero Engines" the inspiring statement that the Government is willing to spend £10,000 on a promising experimental engine, and hasten to

warn engineers and others with "promising" proposals that such is not the case unless they can ensure that terrible "influence," which is a necessary evil of our bureaucratic control, and my experience shows that the Government is not willing to spend one penny to develop any engine.

During 1915 specifications and drawings were submitted to the authorities at the Royal Aircraft Factory, Farnborough, describing a simple mechanism and system for positively "scavenging" the cylinder and maintaining a high compression ratio at all conditions of throttling, the promising result being some 20% increase of power and 5% increase of overall efficiency; also prospects of maintaining the efficiency when the engine was working on a less dense atmosphere at high altitudes.

The Farnborough authorities replied admitting that the proposed system would supply the promised results, but that the extra power generated would necessitate a stronger crankshaft—truly a marvellous grasp of the principles of mechanics. Further, that they were so busy that it was impossible for them to carry out experiments.

The writer proposed that he would design and supply the necessary mechanism if they would set apart an engine, and during 1916 again submitted proposals, all of which were dismissed, with the suggestion that some private firm should build an engine.

The correspondence was signed by a person named Smith for Lt.-Col. O'Gorman, who shortly afterwards publicly stated that the Farnborough Factory was used solely for experimental work.

The Admiralty expert also admitted that the system was correct theoretically, but might cause secondary unbalanced forces, and the hearing might "seize," don't you know; which, of course, was above all argument, for bearings do "seize" in the best regulated engines.

Finally, I submitted the proposals to the Inventions' Bureau, who allowed that some of the members of the Board were interested in the idea: would I send a working model that I had mentioned to London.

Well, my working model had been working some few years, and I suggested that just "one" of the thousands of condemned aero engines should be placed at my disposal to equip with the proposed mechanism, but the Government could not take the risk, and the model was to be sufficient.

I thought it wise to buy a new model engine, and applied to the Board for a Priority Certificate, but they could not even risk the cost of that.

W. E. PHILBROW.

Glasgow.



**TWO V. THREE-SPEED GEARS.**

Sir,—In a letter on this subject in your issue of October 11th, Mr. Comery says, "Two speeds are not enough, at any rate for sidecar combinations." May I ask if this gentleman has ever heard of the Royal Enfield motor cycle? No doubt other riders of this machine will praise the gear (two speeds) fitted. Three-speed gears would have been in greater demand if certain firms had not rushed in with "boxes of wheels" in back hubs some time ago.

Waltham Cross.

SAPPER, R.E.

**FINS.**

Sir,—I should like to know why motor cycle engine manufacturers place the fins of their V twins at the same angle as the cylinders, also why flat twins have their fins placed around the cylinders. Would it not be better to place them horizontally on both V's and flats? This would allow the air draught set up by the motion of the motor cycle to pass through the fins and greatly assist the cooling—the much-desired thing in air-cooled engines. Good deep fine cut fins, similar to the B.S.A.'s (minus the ones they place up and down the cylinders, a kind of support I think).

I may add that I am a constant reader of your paper, and find it most interesting, and full from cover to cover with most instructive information.

DOUBLE X.

Belfast.

**SPARKING PLUG DESIGN.**

Sir,—Being an enthusiastic motor cyclist, and one who is in the habit of riding long distances at speed, the subject of plugs is one of vast interest to me. In your issue dated November 22nd I was surprised to read that "the Lodge racing plug, owing to its effectively cooled electrodes, is very susceptible to the ill-effects of oil." I am the owner of a 2½ h.p. A.J.S. machine, and in April, 1916, I purchased a Lodge racing plug, which I continually used without once removing for seven months, and even then it was good for another few months. I always slightly over oil my engine, but the plug was only just sooted over, and I was easily able to wipe off the soot with a rag. I must say that I think "Chinook" has a wrong impression of the Lodge racing plug.

J.B.

Shrewsbury.

**CENTRIFUGAL FORCE.**

Sir,—I am willing that "Mohandis" judge between "G.R.B." and myself re centrifugal force, as "G.R.B." suggests.

It is now only a quibble as to the extent to which the following operate in the riding of a cycle: Centrifugal force, gyroscopic action, altering the base of support under the centre of gravity.

It was my contention that the latter played a greater part than "G.R.B." admitted, and in his reply he endorses my contention when he says, "I must be aware that a cycle 'banks' when rounding a corner."

I deny this, because it leaves out the personal element. A cycle does not bank, it is the rider who "banks" it. I did not deny the existence of centrifugal force (see my letter, fourteenth line, November 15th). This force plays an important part. But let "G.R.B." consider the average run with its changes of speed, avoidance of traffic, cornerings, wind, etc. Can he construct a machine which will go on a run without a man? When he tries this he will find how great a part is played by "mechanical balance" and "altering the base of support under the centre of gravity," which is the personal element which I wished to emphasise and which is always uppermost in any cycle run.

Newcastle-on-Tyne.

TOP HEAVY.

Sir,—I notice that the discussion as to the part played by centrifugal force in maintaining the perpendicular of a cycle still continues.

My contention is that, whilst it helps to keep the rider upright, it plays a very minor part in the actual balancing, and my excuse for "butting in" at this late date is that none of the critics has touched upon what appears to me the simplest explanation as to why it is more difficult to balance a cycle when stationary than it is to balance it when in motion.

To balance a body it is necessary to keep the centre of gravity exactly over the point of support, or, which is much

the easier, to keep the point of support directly underneath the centre of gravity.

If I stand on one heel and try to keep my balance I fail ignominiously, but if I hop about on one heel I have no difficulty whatever—that is, as far as skill is concerned, though the necessary exertion is somewhat exhausting to the middle-aged. In balancing the cycle when stationary the performer has to keep the centre of gravity over the point of support, being able to move the latter to only a limited extent. On the road, however, he has full control of this (the point of support) by means of the steering, and as he feels himself falling towards one side or the other he simply brings the wheel under himself.

W.D.H.

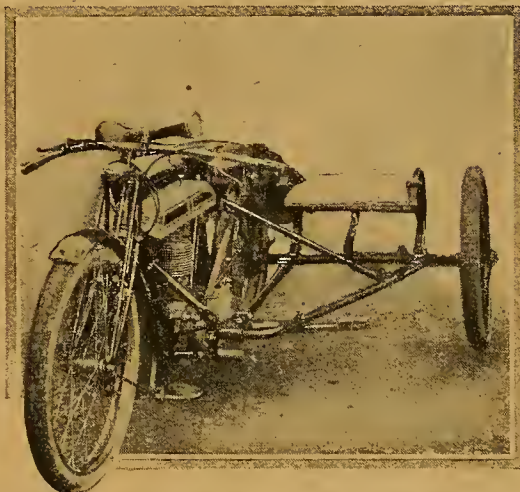
Bentham.

Sir,—I should like to thank "G.R.B." and "Top Heavy" for their interesting contributions to the discussion on "Centrifugal Force," initiated by my article of September 20th. "G.R.B." offers the flattering suggestion that I should adjudicate in the problem, but I should scarcely care to claim the degree of omniscience necessary for giving an unchallengeable decision. As far as my knowledge goes, however, it inclines me to give unqualified endorsement to the views "G.R.B." himself expresses in his letter of October 25th. The illustration he gives of the effect of gyroscopic action is a most valuable one.

"Top Heavy" appears to be confused between the mental and muscular operations which control the forces that hold the bicycle upright and the forces themselves. I entirely agree that the mind of the rider plays an important part in steering the machine, otherwise the spectacle of a riderless motor cycle careering along the street would no longer excite interest. But to say that it is the mind that supplies the actual forces required for maintaining balance is hardly more correct than to say that the effort of a few ounces that pushes the throttle lever open is the force that propels the motor cycle.

Although, perhaps, it is not my place to say it, yet I think that "G.R.B.'s" request for a summing-up of the points raised in this column is worthy of serious attention in a much wider sense than he intended. The one unsatisfactory feature of discussion by correspondence is the absence of anything in the nature of an impartial and authoritative ruling on the question at issue. What usually happens is that after various views have been expressed—some right and some manifestly wrong—the debate peters out before a decision has been reached, and the uninitiated are just as likely to be misled by unsound views as they are to be convinced by correct ones. I quite realise the difficulty of securing an authority of the necessary weight and impartiality; but I respectfully suggest that an attempt be made at least to eliminate hopelessly inaccurate opinions.

MOHANDIS.



A sidecar constructed by Cpl. Art. A. Watkinson, from oddsments picked up in France. It has been hundreds of miles over very rough ground, and has not given a moment's trouble. The "bodywork" of the sidecar will be seen to be on somewhat novel lines.



## FLYING FACTS AND THEORIES.

Sir,—I noticed in your issue of December 6th a letter from A. E. Brittain, R.F.C., criticising Mr. W. G. Aston's statements about turning an aeroplane up wind or down. Mr. Brittain reminds one of the caterpillar in "Alice in Wonderland," who, in answer to Alice's questions, merely replied, "You're wrong." He says: "A boy's kite will only rise with the wind if one runs along the ground fast enough," etc. "Obviously an aeroplane must work on the same lines," etc. Cannot Mr. Brittain grasp the fact that the pull on the kite is exerted, through the string, by the boy moving over the ground, while the pull of an aeroplane's propeller is exerted on the air? A balloon is stationary in the air, though it may be moving rapidly relatively to the earth; and an aeroplane may be stationary in relation to the ground while moving quite fast through the air.

I hope Mr. Aston will convince "O.J.F.S." and Mr. Brittain, as they seem to need a good deal of convincing.  
Haslemere.

COMMONSENSE.

Sir,—As correspondence on the subject of my previous letter dealing with "Turning up and Down Wind" appears to have ceased, I will reply to Mr. Aston's remarks on it, if you will be good enough to spare me space. In the first place, I must agree with him that there is scope for all the informative articles possible, but with this qualification—that they should preferably be written by one with experience of his subject.

To continue, I cannot admit that, as he says, the fact of his not being a pilot has nothing to do with the case. Personally, I always consider it an advantage when writing on a subject to have something more than a merely theoretical knowledge of it, and I do not object to Mr. Aston's views, but to his disguising them as facts.

One of these alleged facts is that, "if the throttle is not opened at the moment of making the turn, the machine will lose height!" Mr. Aston in his theoretical flights may get off the ground with his throttle half open; people who fly practically do not, and one can make a perfectly good climbing turn on some machines without having full throttle.

Again, "since it is flying normally in a straight line, some power must be provided to alter its state of motion, and the only source from which this can come is the engine"—and yet one does hear of turns on the glide.

Another point on which Mr. Aston appears ignorant is that one turns by the horizon and the feel of the machine, and not by watching the earth, so that a knowledge of the wind is unnecessary. Similarly, Mr. Aston's cyclist doubtless banks by "feel," not by a series of comic speedometers and protractors to measure his speed and angles.

O.J.F.S., Lt. R.F.C.

## RADIAL AND ROTARY ENGINES.

Sir,—Re Mr. W. G. Aston's article in *The Motor Cycle* of December 6th on "Flying Facts and Theories," I have no idea as to when this article was written by Mr. Aston, but I consider it must have been when the rotary radial engine was quite in its infancy.

As I suppose Mr. Aston is aware, the seven-cylinder rotary or rotating engine is practically obsolete, and has been superseded by the nine-cylinder. I have a little experience of the latter type of engine, and should like to point out that the methods he (Mr. Aston) states as regards the fastening of the connecting rod to the crankshaft are rather obsolete. There is no need to fork any of the rods or to employ a master rod, which naturally, as Mr. Aston states, would upset the balance to a slight degree. Another point is that there is no need for innumerable rods to operate the valves from the cams; one rod for each cylinder, operated from two cam plates with sufficient profiles, is all that is needed.

Another point: I suppose Mr. Aston is referring to a stationary radial when he alludes to large quantities of unused oil being blown through the exhaust pipe, for up to the present I think there is only one rotary radial engine which has exhaust pipes fitted.

I am, of course, adverse in my views to Mr. Aston, purely regarding an engine designed for aero work, and, like "Dyne," beg that Mr. Aston will not place me entirely *hors-de-combat*, for I am also out on the same quest.

S. A. REEVE, Lt. Cpl.

## STRENGTH OF MATERIALS.

Sir,—Your correspondent "A.C.C." is absolutely right in his statement *re* the true form of a load-extension diagram. I also am in a position to furnish results of actual tests taken by myself; and, in point of fact, I had such a test sheet before me when preparing the diagram to which "A.C.C." refers. In the interests of simplicity I deliberately suppressed the fact of the difference between the maximum load and the breaking load, judging that the space required for explaining the point could be more profitably employed otherwise. I offer no apology for so doing, as the introductory remarks to the series made it abundantly evident that I should not hesitate to sacrifice scientific accuracy in minor details to the need of conveying a clear general impression. If "A.C.C." will therefore allow me to consider his letter as supplementing rather than correcting my article, I gladly acknowledge his help.

MOHANDIS.

## TWO USEFUL HINTS.

Sir,—Having noticed on many occasions various tips in *The Motor Cycle* that have been very useful to me, I am sending the following, as it may be of use to some of your readers:

With the overhead valve inlet engines, as the M.A.G., the inlet dome is often most difficult to remove when overhauling. First, place a large nut or piece of wood above the exhaust valve to prevent it rising off its seat, and remove the spring, etc., in the usual way, then remove the block or nut, and drive the inlet dome out with the exhaust valve. Provided one hits the exhaust valve quite squarely, there is little likelihood of damage.

Another tip, which I believe I originally saw in the "Blue 'Un" in reference to worn main bearings, I adopted to a gearshaft on which the cone, which was a driving fit, seized and wore a groove about  $\frac{1}{4}$  in. deep in the shaft. The temporary repair was as follows:

Fine iron wire was bound round the worn groove to fill up the part worn away. This wire was brazed in, and the holes, etc., filled up with solder. The cone was driven on, and is still running gaily, and looks like running some time until the new part can be obtained, possibly *après la guerre*.

I must apologise for so long an epistle, and offer my appreciation for the interesting hours spent reading *The Motor Cycle*, especially in training, trenches, and hospital, when I was one of the

ROYAL SUSSEX.

Eastbourne.

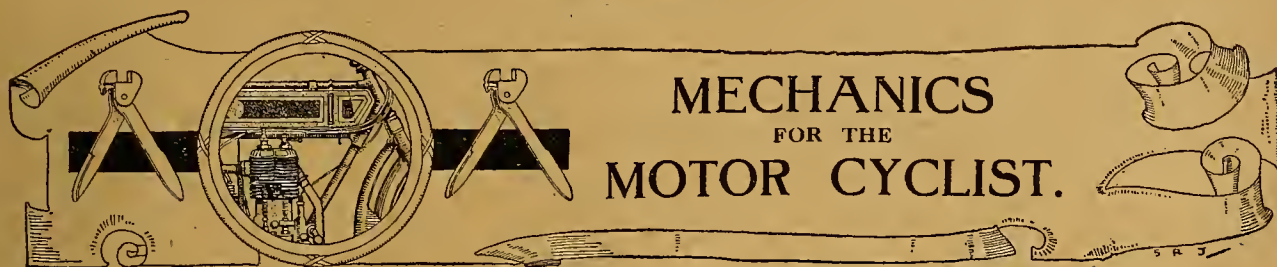
## THE FOUR-CYLINDER MOTOR CYCLE.

Sir,—Recent references to the four-cylinder engine in connection with motor bicycles naturally interest me, since, for several years prior to the outbreak of war, I was interested in the F.N. four-cylinder motor bicycle, which, it may surprise some readers to learn, was first marketed in 1905. This machine had an increasing sale year by year, but was appreciated more in foreign markets than in the British Isles. The two years preceding war, however, witnessed a considerable increase in popularity, and the special new 7 h.p. model introduced for the 1914 season met with a most satisfactory reception, so much so that the number available for this market was booked by January. The chief features of this model, which was specially designed for sidecar work, were: 7 h.p. four-cylinder engine, 748 c.c., separate cylinders, 52 mm. bore, 88 mm. stroke (long stroke engine), valves on opposite sides and all interchangeable, deep aluminium crank case with oil sump, true mechanical lubrication, short stout crankshaft carried on only two ball bearings and very generous dimensions, outside flywheel incorporating multiple-disc clutch, three-speed gear and shaft drive and bevel gearing, price £78. This machine was a gem to handle. Its geared-up kick starter and small cylinders reduced starting efforts to a minimum. The four-cylinder engine and Zenith automatic carburettor with pilot jet would "tick" over, and the multiple-disc clutch ensured a smooth progressive pick up at low engine speeds.

Though having no pecuniary interest in this machine now, I still have the same faith in the future of the four-cylinder type of motor bicycle, both for sidecar and solo work, and feel confident that its manifold advantages will be generally recognised soon after we return to normal times.

HARRY G. BELL, Lt. R.F.C.





## MECHANICS FOR THE MOTOR CYCLIST.

### Eighth Instalment: STRENGTH OF MATERIALS. II.

Previous instalments appeared on July 15th, August 9th, August 23rd, September 20th, October 1st, October 25th and November 8th

THE figures given in the preceding article for the elastic limit and breaking stress of steel (16 tons per square inch and 30 tons per square inch respectively) refer to ordinary qualities of "mild steel" such as are utilised in enormous quantities in general engineering work. For use in automobiles, however, where a combination of lightness and strength is indispensable, higher grades of metal are called for. These can be obtained by the addition to the steel of small quantities of other ingredients, *e.g.*, nickel, chromium, or vanadium; or by suitable heat treatment. For instance, in chrome vanadium steel, as used for crankshafts, pinions, etc., the elastic limit may be as high as 65 tons per square inch, and the breaking stress 85 tons per square inch.

Attention may be drawn to one very interesting method of increasing the tensile strength of steel without any alteration in its chemical composition. This is the process of wire-drawing. Wire is produced by drawing steel rods through dies of successively diminishing area, thus compressing the metal to a smaller diameter at each "pass." In this way the metal becomes harder and stronger; and consequently a wire rope not only has the virtue of flexibility, but it will actually sustain a much greater load than will a solid bar of the same sectional area.

For purposes of comparison, approximate figures for the tensile strength of other metals used in motor cycle construction may be quoted. The elastic limit and breaking stress in tons per square inch are respectively: For cast iron, 10 and 10 (this metal remains elastic practically up to the point of fracture); for phosphor bronze, 8 and 25; and for aluminium, 4 and 8.

#### Compression and Tension.

The value to the designer of information relative to the tensile strength of metals is limited by the fact that only a few components of a motor cycle are subjected to a direct pull or tensile stress; in fact, wheel spokes and brake rods and cables are the sole items that occur to one on the spur of the moment. We must therefore discuss other methods by which

materials may be stressed and strained. What stresses are induced, for example, when an attempt is made to *bend* a piece of steel? This question can best be answered by considering in the first place some softer material in which the strains are visible to the eye. If a block of indiarubber is loaded as shown in fig. 1,

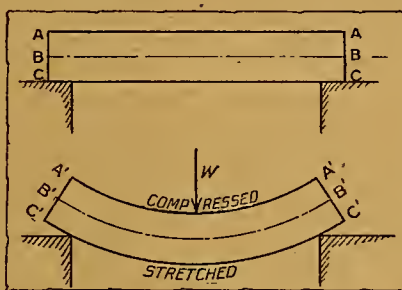


Fig. 1.—Diagram to show stresses in a beam.

deflection will occur in the manner indicated. Comparing the unloaded beam with the loaded one, we see that the length of the upper surface has diminished from AA to A'A', while that of the lower surface has increased from CC to C'C', the length of the centre line BB remaining unchanged. That is to say, the material above the centre line has been compressed, while that below has been stretched; in brief, the upper fibres are in *compression*, while the lower ones are in *tension*.

These statements hold good just as well for metals in which the deformations are imperceptible as they do for yielding substances of the nature of indiarubber.

#### "H" Section Beams.

Now since the layers of material remote from the central plane are stretched or compressed more than those nearer to this plane, it follows that they contribute more to the strength of the beam than do the latter. Hence a comparatively large amount of metal may be removed from the central section of the beam (as shown dotted in fig. 2) without sensibly reducing its strength. We thus obtain the familiar "H" section beam, or "rolled steel joist," so extensively used in constructional work. The same principle dictates the section adopted for the front axles of cars, the frame of the chassis, etc.

Although beams are usually designed so that they shall deflect as little as possible under load, occasions arise when considerable deflections are desired. This can easily be arranged by laminating the beam, thus giving us the familiar leaf or plate spring, flexible in one direction.

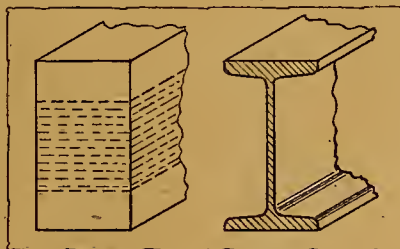


Fig. 2.—Showing development of "H" section beam.

#### Torsion.

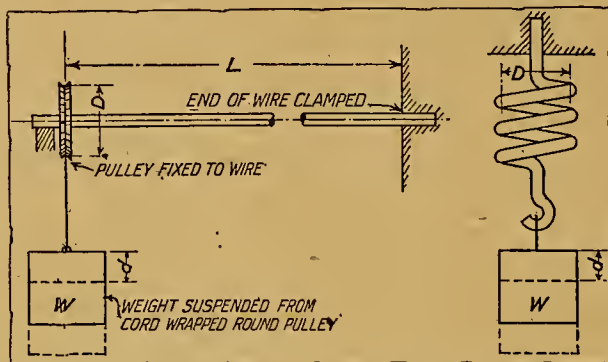
The precise kind of stress produced when a bar is twisted is not at first sight easy to determine. Without going into details, it may be said that the



### Mechanics for the Motor Cyclist.—

material of the bar is subjected to a "sheer" stress—a stress of the kind undergone by, say, a joint pin in a forked joint.

A motor cyclist called upon to show you parts of his mount subjected to torsion would have no difficulty in doing so, for any revolving shaft through which power is transmitted would provide him with an example. But he would probably be immensely surprised if you were to inform him that the wire of the valve springs is also in pure torsion. Such a statement, however, would be absolutely true. In all helical (or so-called "spiral") springs under load the metal has to withstand solely a twisting stress. It is not essential to coil a length of wire into a helix in order that it shall fulfil the functions of a spring. Advantage can be taken of the "springiness" of the wire, while keeping the wire perfectly straight, in the manner suggested in the sketch. Manifestly the material has now



Experiment to prove that the wire in a loaded helical spring is in torsion. The total length of wire in the coils of the spring on the right is equal to the length  $L$  of the straight piece of wire.

to sustain no other stress than a twisting stress, and it can be shown experimentally that the amount  $d$  by which the weight descends as the wire twists is identical with the deflection produced by a similar weight hung from a helical spring formed from the same length of

wire coiled to a diameter  $D$  equal to the diameter of the pulley. In both cases, whether the wire be straight or coiled, the stress produced is of the same kind and magnitude.

It may be worth while pointing out that springs of all kinds obey the same laws as other elastic bodies, *i.e.*, the deflection is proportional to the load. If a load of 2 lb. stretches a spring  $\frac{1}{4}$  in. then 4 lb. will stretch it  $\frac{1}{2}$  in., the deflection corresponding to 10 lb. will be  $1\frac{1}{4}$  in., etc. The behaviour of laminated or

leaf springs, it is true, departs slightly from this rule, on account of the friction between the leaves, and this accounts for the valuable quality these springs possess of comparative absence of "rebound."

MOHANDIS.

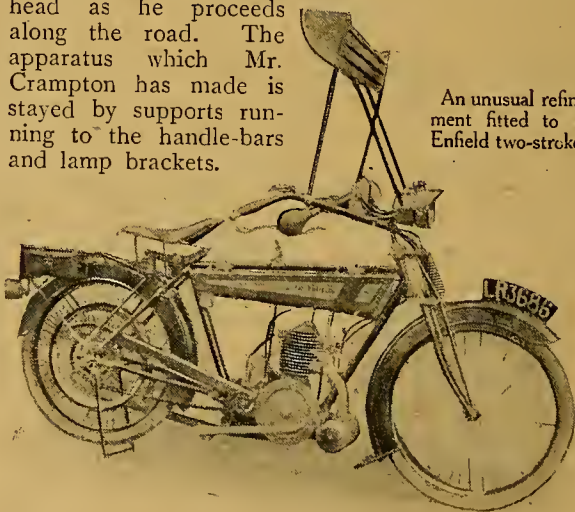
## A Motor Cycle Windscreen.

THE  $2\frac{1}{4}$  h.p. Enfield illustrated is owned by Mr. W. J. Crampton, a well-known electrical engineer, and one of the oldest members of the R.A.C. He began motoring in the very early days, and also had various motor bicycles in 1903 and 1904, and now economy in petrol has forced upon him the necessity of becoming the happy possessor of a two-stroke Enfield. This machine has served him particularly well, and considerably surprised him—a motor car owner of long standing—by its comfort and general handiness. He found, however, that as he was suffering from nasal catarrh, the dust and wind affected him to a great extent, and consequently he devised the screen which we illustrate herewith.

When riding the machine the top of the screen comes level with the rider's chin. It is made of tin and is scoop-shaped, and the front of it possesses three slats fixed at an angle. Mr. Crampton assures us that the screen is most efficient, in action, and that all draught, dust, and flies are shot clean over the rider's

head as he proceeds along the road. The apparatus which Mr. Crampton has made is stayed by supports running to the handle-bars and lamp brackets.

An unusual refinement fitted to an Enfield two-stroke.



## PETROL ORDER AND LIGHTING REGULATIONS.

MOTOR cyclists who have difficulty in grasping the Motor Spirit Restriction Order and the Lighting Regulations now in force will be interested in a card recently published by the Car and General Insurance Corporation, Ltd., 83, Pall Mall, London, S.W.1.

By perusing the card the motor cyclist may see at a glance for what purposes he may use his machine. On the opposite page the Lighting Regulations are

set out with equal clearness, alike for the London area, the district outside London, and also Scotland and Wales. Mention is also made of the towns in which special regulations apply. The card will undoubtedly be of interest to motor cyclists, and, as it may be had for the asking, most of those "left of us" will no doubt avail themselves of the opportunity. Regulations to the right of us and all round us make imperative scrupulous care in choosing our courses.



# QUESTIONS & REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## Cost of Running on Coal Gas.

**?** Can you tell me the cost of running on coal gas as compared with petrol?—W.P.

The cost of running on coal gas is a great deal less than that of running on petrol. The way to find out the cost is to assume that 250 cubic feet of gas are equal to one gallon of petrol, and to work out the cost from the knowledge you have of the price per thousand cubic feet of the gas supplied to your house.

## Replacing a Bowden Wire.

**?** The Bowden wire of the petrol lever of my machine has worn through. Would it be best to send the carburetter and controls to the works and have new ones put in, or would it be possible to put them in myself, as I have the wire?—H.A.

Replacement of the Bowden wire of the throttle control is quite a simple matter if you have the wire. If you feel that it is likely to be beyond your powers, there is no actual need to return the carburetters to the makers, as any small garage or cycle repairers should be able to fit you a new wire while you wait. Should, however, the spring of the throttle be gone, we would advise you to return the carburetter to the makers, if they are able to undertake the repair—which is scarcely probable.

## Conversion from Petroil Lubrication System.

**?** I have a 2½ h.p. two-stroke motor cycle, and am thoroughly fed up with the system of lubrication. I intend trying the following idea, and should like your opinion as to whether it would be successful: On the opposite half of the crank case to where the oil outlet screw plug is there is a place left on the casting for a similar fitting. If I were to bore out this and tap it, then fit a non-return valve and a pipe to a drip feed from the tank, would the engine obtain its supply of oil properly? I may say the place where it is proposed to put this fitting is practically at the bottom of the side of the crank case casting.—P.A.S.

Your suggestion as to fitting an oil supply from the tank to the engine through a drip feed should work quite satisfactorily, and we see no reason why you should have any special difficulty in the fitting. The engine will draw its own supply, which you will be able to gauge by means of the lubricator regulator screw.

## Tax for a Gas Trailer.

**?** I should be glad if you will tell me if I am liable to pay the same tax as a motor car if I fit up a trailer to carry a gasbag in conjunction with my sidecar combination.—N.L.B.

No; in this case you have to pay a 15s. tax for the trailer, in addition to the tax you also pay on the sidecar outfit.

## Exhaust Valve Not Lifting.

**?** I have lately purchased a three-speed hub gear 1914 solo Triumph, which heats up considerably; in fact, my longest run has only been eight miles, and then it seized up. On looking over the machine I find that the exhaust tappet only lifts ¼ in., while the inlet lifts ½ in. The valves seem to have the proper clearance. I should like to know the reason for this, and if I can remedy it.—J.L.

The exhaust tappet should lift the valve at the very least ½ in. Evidently the tappet requires adjusting or else something is badly worn. You should examine the parts carefully.

## The Disposal of Fuel in Stock.

**?** I have a fair stock of petrol, which has gradually accumulated, and which I cannot now use on the road. May I sell this to a friend who has the right to use his machine but is handicapped by lack of fuel?—D.O.R.A.

You may not dispose of your petrol or other fuel to your friend for use in his machine in any way—by gift, loan, or sale in the ordinary manner—unless you are a licensed dealer, which we presume you are not.

## Using Stock Petrol.

**?** In September of 1915, after selling my motor cycle, I had a fair quantity of petrol left—about fifty gallons. I used none of this until I bought an Enfield combination in July of the current year. I have still a quantity left. Will there be any objection to my using this?—J.B.

No liquid hydrocarbon may be used for fuel for a motor unless the machine is essential for the execution of some work of national importance, or one of the purposes permitted in the recent Order.



IN WINTER'S GRIP.

The scene will be recognised by many motor cyclists as the Grove—the junction of the two beautiful roads which lead from Coventry to Kenilworth and Leamington.



### The Use of Petrol.



Can I use my sidcar, as I have a licence for two gallons of petrol a month for the delivery of bread. Sometimes I have to go to a neighbouring town in connection with my business. Am I allowed to take my wife in the sidcar?—G.W.

There is nothing in the Motor Spirit Restriction Order to forbid you carrying a passenger in the sidcar when using petrol for a purpose permitted in the Order. We presume you have a full-duty licence.

### Burned Platinum Points.



I recently bought a 1914 Baby Levis. For the first hundred miles the machine ran well, but after this misfired occasionally, and gradually got worse for twenty miles, until I had my work cut out to get home. Examination showed the magneto points to be almost devoid of platinum and badly pitted. These were cleaned up, and on refitting them I could not get the engine to fire with a gap more than .2 mm., about the same as when I took them out. The misfiring being no better, I thoroughly cleaned the carburetter, jet, and petrol pipe, fitted new high-tension wire, new fibre pad, new plug, and cleaned both carbon brushes, but with no improvement. Do you think the trouble is caused by (1) need of new platinum points, (2) weak magneto, (3) faulty armature, or could you suggest any other probable cause?—R.H.

(1.) The trouble is probably due, as you suggest, to the need of new platinum points, but there may be a bad condenser connection. (2.) There is nothing in your letter to show that the magnets are weak, (3) nor that the armature is faulty. A gap of .4 mm. is correct.

### Use of Chemical Decarbonisers.



I have a 7.9 h.p. twin-cylinder Harley-Davidson combination, and as I do not understand taking down the engine, would you advise me to use Johnson's patent cleaner for decarbonising? Shall I find any drawback by using this? I should be very grateful if you could give me particulars.—J.E.S.

We have lately tried Johnson's decarboniser, and found that it undoubtedly has an effect upon the carbon deposit of an engine. One cylinder should be treated at a time, and the makers' instructions should be carefully followed. It will be noticed that after treatment the engine will fire on one cylinder only for about half a minute; then the other cylinder will fire, and flakes of carbon will be blown out of the exhaust port. The machine should then be taken for a ten-mile run and driven fairly hard, and then the other cylinder is ready for treatment. When both have been dosed, it is advisable to remove the valves, feel the top of the piston with a scraper to ascertain if it is fairly clean; then remove all traces of deposit from the valve stems, valve ports, etc. This is a good opportunity to grind in the valves if they need it.

### Hub Gear Kick Starter Trouble.



My machine is fitted with a Mark VI. Armstrong hub gear, and my trouble is that I cannot use the kick-starter. Immediately any pressure is put on the kick-starter pedal something seems to give with a jerk, and the sprocket slips round quite freely. On bringing the pedal up, however, for a second attempt, it seems gradually to catch again, and so long as no great pressure is put on the pedal everything appears to be in order, and the engine may be gently cranked over without any sign of slipping. I have dismantled the wheel, and taken the gear to a local repairer, who assured me that everything was quite in order; and I have carefully examined the ratchet portion of the gear, but can find no trace of a defect here. The defect has only developed since the wheel was overhauled locally. The overhaul, I might mention, cost £6 2s.—A.R.

From the symptoms you describe, we should imagine that the trouble is not actually in the gear, but in the free wheel mounted on the offside of the hub. If you have not already done so, flush this out carefully with paraffin, and if this does not effect a cure, take the free-wheel down and see that the coil springs actuating the pawls are working quite freely and are not broken.

### Timing and Transfers.



Would you be good enough to give me the following information: (1.) How to time a 4 h.p. Norton, both valves and magneto? (2.) How to fix transfers on to motor cycle frames?—H.W.

(1.) The valves should be timed as follows: Set the exhaust valve to close just after the completion of the exhaust stroke. It will then commence to open when the piston is about one-seventh of the length of the stroke from the bottom of the firing stroke. The inlet should commence to open as the exhaust closes and remain open for one complete stroke of the piston, or a little more, i.e., while the flywheels turn through about 190°. Magneto: Place the piston exactly on top of the compression stroke and connect up the magneto with the points just about to break and the ignition lever two-thirds retarded. This will mean that the explosion when the ignition is fully retarded will take place when the piston has travelled about 1.5 mm. down the firing stroke. (2.) The following instructions will assist you in affixing gold and coloured transfers: Take a very small quantity of copal varnish, gold size, or any quick-drying varnish, coat the face of the transfer as thinly as possible (a short hog-hair brush is recommended for this); cut all superfluous paper away from the transfer, and let it remain for about one minute, when it should be just tacky. Then place it face downwards on the object, pressing well down, damping back with a moist rag or leather, slightly at first, and gradually increasing moisture until well soaked. The paper may then be lifted off, leaving the transfer perfect. Wash over the face of the transfer lightly to remove any gum which may be left on the surface, otherwise the transfer will be liable to crack, especially if it is a

coloured one. When quite dry give a thin coating of varnish, which will improve the appearance and prevent the transfer from being rubbed off. These instructions also apply to transfers printed upon "Duplex," or stripping paper, except that after varnishing, and before placing on the object, the two papers should be carefully separated. Transfer varnish can be supplied by our transfer department.

### Cylinder Boring.



(1.) In the case of a twin-cylinder engine, if one cylinder needs re-boring, is it necessary for the other to be done as well? (2.) When a new piston is fitted, should it be the same weight as the old one? (3.) What is the correct clearance between the piston and the cylinder wall? (4.) Of what materials are pistons usually made?—A.W.

(1.) It does not really matter; if one is bored out, the other, if in good condition, could be left alone. (2.) The new piston should be the same weight as the old one. (3.) About  $\frac{1}{1000}$  in. at the top of the piston, and approximately  $\frac{1}{1000}$  in. at the bottom. (4.) Pistons are usually of cast iron.

### Direction of Revolution of a Magneto.



Some difference of opinion exists as to how the travel of a magneto is recorded—clockwise or anti-clockwise. Is it recorded, on looking at the magneto, from the contact breaker side or from the sprocket wheel side? Your decision would be much appreciated in the columns of your valuable paper.—E.Mc.

The description of the direction of revolution of a magneto is made when the magneto is looked at from the driving, i.e., the sprocket, end. In other words, if you look through the tunnel towards the contact breaker and the magneto turns in the same direction as a clock, it is said to be clockwise; if it revolves in the opposite direction, it is, of course, anti-clockwise.

### RECOMMENDED ROUTES.

#### TILFORD TO LITTLEHAMPTON.—J.W.

Tilford, Elstead, Milford, Chiddingfold, Petworth, Fittleworth, Arundel, Littlehampton.

#### SOUTH SHIELDS TO ST. HELENS.—H.H.S.

South Shields, Sunderland, Durham, Bishop Auckland, Barnard Castle, Bowes, Brough, Kirkby Stephen, Sedbergh, Kirkby Lonsdale, Lancaster, Garstang, Preston, Wigan, St. Helens.

#### BIRMINGHAM TO EASTBOURNE.—H.G.M.

Birmingham, Henley-in-Arden, Stratford-on-Avon, Shipston-on-Stour, Enstone, Woodstock, Oxford, Dorchester, Benson, Nettlebed, Henley-on-Thames, Wokingham, Bagshot, Guildford, Horsesham, Cowfold, Bolney, Burgess Hill, Hassocks Station, Ditchling, Lewes, Wilmington, Eastbourne.

#### BIRMINGHAM TO BOURNEMOUTH.—H.G.M.

Birmingham, Henley-in-Arden, Stratford-on-Avon, Shipston-on-Stour, Chip-ping Norton, Burford, Lechlade, Swindon, Marlborough, Pewsey, Upavon Amesbury, Salisbury, Downton, Fordingbridge, Ringwood, Christchurch, Bournemouth.



# THE MOTOR CYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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**W**HEN the number of makes of British machines is considered it is found that there are very few successful types which show real originality. There are many single-cylinder motor cycle engines, a host of makers using V twins, and just one or two horizontally-opposed twins, but not at present a solitary British-made four-cylinder machine. In the past our makers have played for safety. They have copied and improved upon existing machines, and have sold countless numbers, so they cannot altogether be blamed for this not particularly brilliant or progressive policy. There has been an increasing demand for motor cycles, and the manufacturers have been content to say to the buying public, "Here are good machines; they are reliable, and they will take you out and bring you home."

This is all very well so long as the motor cycling public has not been educated to appreciate anything better, but the time will come when the average motor cyclist will want a little more, and will desire something which will do these things but with far greater comfort than in the past. Also, in the future we shall have to compete more with foreign makes, and we shall have to produce machines which are more attractive in every respect than the pre-war models.

It is quite clear, therefore, that our designers and our business men must alter their methods. The designers must show more originality, and the business men must study the business methods of foreign concerns. When the war ceases we must seek to increase our exports. In the great struggle to recover we must sell all we can to the vast markets which await us, and to sell easily we must make our goods attractive. To return to the four-cylinder motor cycle. How many motor cyclists have had experience with this type? Very few, because there have been but few of these machines on the market.

Nevertheless, though British riders had comparatively few chances of acquaintance with four-cylinder machines their adherents were most enthusiastic. As our own experience of this type, though extending to a four-figure mileage, and all too short at that, was entirely delightful, we cannot help thinking that it has a great future. Those who have never tasted the joys of driving a fast four-cylinder will be prone to condemn it for its complications and its weight—objections which, in our opinion, have no real significance whatever.

Unnecessary complication is an evil, but we are presuming that we have to deal with an engine with four cylinders, eight valves, and so on—no more complicated than a car engine. We remember people who years ago objected to the four-cylinder car merely because its engine had eight valves. And yet such an objection is never heard at the present time. A complication ceases to be a complication (in a bad sense) when it is so well made that it gives no trouble until a long period has elapsed. Take the ordinary office typewriter. This is a far more complicated piece of mechanism than a four-cylinder engine, and yet many motor cycle manufacturers who would not hesitate to buy a typewriter still think a four-cylinder motor cycle engine too much for them to tackle. Then, as regards weight. A well-known American four-cylinder engined motor bicycle weighs much less than the average U.S.A. twin which has a motor of equal cubic capacity. We must not forget that, despite the lightweight craze which was at its height before the war, there were plenty of enthusiastic riders of heavy twins. Again, the uninitiated are often too prone to lose sight of the fact that weight on a motor cycle matters not at all when the machine is under power, and is inconvenient only when it is being wheeled about. Furthermore, we are quite confident that in the future our manufacturers will be able to produce quite a light four-cylinder motor cycle engine.



# The Song of the Great open Road

By CAPTAIN F. M. LIVINGSTON-JAMES.



Y heart a wild theme is inditing,  
Which, I'd weave in a jubi-  
lant ode,  
Though it's hard to reduce it  
to writing,  
The Song of the Great Open Road.

Break away! from the shackles that bind us,  
That petrify body and brain.  
Come away! as the miles drop behind us  
We shall know we are living again.

With our engines contentedly purring  
The lay of the clean and the strong,  
Our atrophied pulses are stirring  
To the lilt of that glorious song.

Away! to the wide open spaces;  
Away! from the crowd and the din;  
The breeze sweeps fatigue from our faces,  
And whispers contentment within.

Those wild magic voices are singing  
That sang when Creation was young;  
List now! for the breezes are bringing  
Some words of the song that was sung.

Away! where the curlew is calling;  
Away! to the moor and the fen;  
Nature's peace all our senses enthralling,  
Unsoiled by the traffic of men.

Where the shadows of beeches are drifting  
Like clouds on the sheen of the grass,  
And the dun-speckled cattle are lifting  
Their soft eyes to gaze as we pass.

Our wheels are de-  
vouring the distance,  
And eat up the miles as we go  
That lie between Life and Existence  
Till we come to a country we know.

Does Poynings still dream in her hollow?  
Flows Arun still down to the sea?  
Lost trails, known of old, shall we follow?  
Come, ride them together with me.

Does the shadow of Parlick still cover  
That wild glen where the irises grow?  
Is Wolf Fell still the haunt of the plover  
As it was in the days long ago?

Is the Firth ever foaming and fretting  
Round the iron-bound shores of the Cloch?  
Does the sun, in his slow summer setting,  
Stain crimson the dark Holy Loch?

We would know if they're yet as we knew  
them,  
Those dear spots we remember—and so,  
As the Road waits to lead us back to them,  
Let us take it together—and go.

Break away! and the morning shall find us  
In tune with that golden refrain;  
Ride away! as the miles drop behind us,  
We shall know we are living again.

\* \* \* \* \*

Though I've heard brooks and breezes reciting  
That endlessly jubilant ode,  
I've failed to reduce it to writing!  
The Song of the Great Open Road.







### A Four-cylinder Design.

ONE of my correspondents has a strong prejudice against indirect drives and gear boxes in general, though he cites no precise objection to them beyond a complaint of their noisiness and a petulant remark that some gear levers get in his way. I go so far with him as to say that I have yet to meet the gear box which I really love. Many of them give a wholly unpardonable amount of trouble, and complicate chain adjustments quite unnecessarily, whilst most of them get abominably dirty, and are extraordinarily difficult to clean. Only a crank could follow this officer in desiring the abolition of gear boxes; but his weird prejudice has inspired an interesting suggestion. His idea of the ideal four-cylinder is that it should have a double V engine, with the crankshaft athwart the frame, the rear cylinders vertical, and the front cylinders dipped forwards. If I remember aright Glen Curtiss once produced a freak racing machine along these lines. The engine should be extremely accessible, and even cooling could be simply arranged. The location of the engine in the frame is the main trouble. If it were placed forward its width would splay one's feet out rather unpleasantly. If, as one reader suggests, it were placed far back, possibly with the rear cylinders against the back mud-guard, and the saddle-pillar tube joining the top of the crank case somewhere between the sloped pair of front cylinders, the weight would come too far aft and the machine would not steer at all nicely. My own idea of the ultimate four-cylinder is that the engine will be a *bijou monobloc*, set in line with the frame, and that it will be greatly reduced in size as we learn to extract more power from a given capacity, and that the drive from the gear box in the crank case will some day be per flexible shaft.

### Power Losses through Gearing.

IT is one of the commonest fallacies that gearing entails enormous power losses through friction, and that these power losses are avoided by various forms of direct drive. In engineering hand-books one finds statements of the percentage of loss with various types of gearing, or of the "efficiency" figures for each type of gear. As a matter of fact, my correspondent probably wastes far more power, on the average, through his favourite direct drives than is lost with a first-class indirect drive. The direct belt drive shows a fixed minimum of waste due to slip, and for 90% of the running this minimum is greatly exceeded, owing to the belt being worn, the pulleys being shouldered or wet, the belt tension incorrect, and so forth. If he favours the direct chain drive, he will find it next to impossible to get a machine so fitted, a two-step gearless chain, with a ball-bearing countershaft, being the nearest approach to it. Such a drive will show a very high efficiency

when it is new, but as the chains and sprockets wear—and they wear very fast if not encased—the efficiency sinks with remarkable rapidity. It is the simple fact that an enclosed two-chain drive with enclosed gears gives as high an average of efficiency as we can hope to attain on motor cycles in the present phase of development. Moreover, it is a little absurd to talk about power losses when we are wholly unable to use such power as survives except on the rarest occasions. Except for a brief burst on a straight hill, the rashest rider in England cannot utilise all his engine power more than once a week on an average.

### The Ideal Gear Box.

WHATEVER a few faddists may say, the gear box has come to stay; and some of us, who went through the campaign for variable gears and remember some of the experiences which motor cycling on single gears entailed, can realise what the riding public owe to gears. However, so far from pretending that existing gear boxes are perfect, let us set out the points essential in a perfect gear box. It should be:

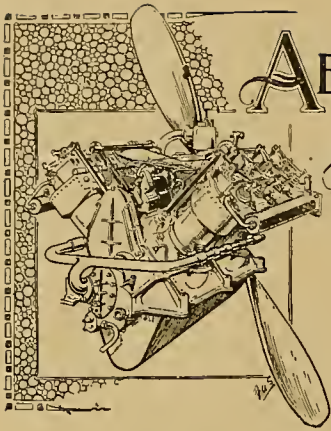
1. Light.
2. Compact.
3. Easily cleaned—i.e., of smooth exterior.
4. Free from excessive friction.
5. Silent.
6. Easily lubricated.
7. Absolutely reliable.
8. Easily adjusted for chain tensions.
9. Simple to "change."
10. Afford at least three ratios.
11. Which should be variable to suit different riding conditions—e.g., by changing a sprocket.
12. Possess a neat and unobtrusive control;
13. Which should not demand complicated adjustments whenever the chains are adjusted or the control links are disturbed.
14. Show a high degree of durability.

No existing gear box approaches this ideal, but a steady improvement in most of the above desiderata is evident, and we can live in hope.

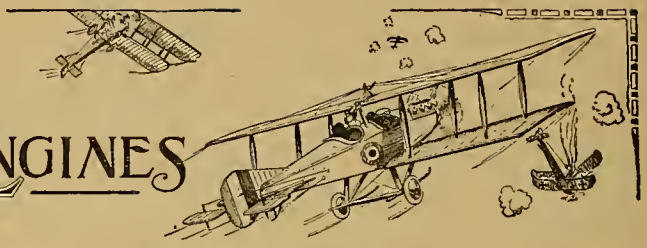
### Piston Design for Two-strokes.

A MODERN type of piston, quite distinct from that described in Mr. Martin's interesting article, can guarantee the effect which he desires and relieve the piston rings of two-stroke engines of the heat and filth of the exhaust gases. Like so many modern inventions, it does not cheapen manufacture, and may therefore prove commercially inapplicable to the cheaper types; but any designer who wishes to turn out a two-stroke to-morrow with practically everlasting piston rings can easily do so at the price of a little complication, and that without launching into the region of experiment.





# ABOUT AERO ENGINES



## No. III.—THE RADIAL TYPE.

Many of our readers are probably ignorant of the special features that distinguish aero engines from motor cycle and motor car engines. Samples of the leading types of aero engines are briefly described in this series of articles, the third instalment of which we print below.

**T**HE radial type of engine is an ingenious attempt to combine the advantages of the vertical and V types with those of the rotary. Like the rotary, it is a very "shallow" engine, measured from front to back; its crankshaft and crank case are very light in weight, and the weight of the engine is concentrated within a very short length of the fuselage. It thus affords two of the prime essentials for the engine of a fast scouting aeroplane; its lightness makes for high speed and good climbing, whilst the concentration of its weight enables the machine to be quick in responding to its controls, so that it can dive and loop and turn with great rapidity and suddenness. On the other hand, it is a simple matter to apply water-cooling to it, and thus it can be built in horse-powers which are beyond the compass of the rotary engine, as they exceed the safety limit of air-cooling. Consequently it is not improbable that we shall hear far more of radial aero engines in the future than we have done in the past. Fighting scouts are always sighing for more horse-power, but have a great aversion to extra weight per b.h.p., and dislike both the weight of the V and vertical types, and also the long stiff patch which a four or six-throw crankshaft makes in a fuselage.

The first practicable radials were the three-cylinder Anzani's. The fan type, illustrated in fig. 1, was air-cooled, and was obviously designed to avoid oil collecting in the heads of the cylinders; as soon as M. Anzani had circumvented this difficulty, he produced the much better balanced Y pattern shown in fig. 2. By 1914 he had evolved and was making seven different sizes of radial engine ranging from three to

twenty cylinders, the latter consisting really of four five-cylinder engines merged into one. This latter engine had a two-throw crankshaft, with two groups of five pistons apiece connected to each crank pin. In this latter engine, when running at 1,200 r.p.m., which was its normal flying speed, there were no fewer than 200 power impulses per second acting on the crankshaft. The Canton - Unné engines, otherwise known as the Salmson, are also famous examples of the radial type.

The cylinders of a radial engine are, of course, stationary, and the crankshaft revolves, exactly as in a motor cycle engine. The crankshaft runs in ball bearings, and is made in at least two pieces, to facilitate the assembly of the connecting rod group. As many of our readers are not clear about the construction of the big ends of a V motor cycle twin, they will readily believe that a big end bearing which carries nine or ten connecting rods upon a single crank-pin is rather a complicated piece of work.

One type of connecting rod big end found in radial engines may be roughly described as follows by comparison with, say, a 4 h.p. Triumph big end. In the Triumph engine the crank pin rotates, and the big end of the connecting rod merely rocks through a small angle, as shown in fig. 3. If we got this rock on the big end of, say, a nine-cylinder radial engine, we should have some pretty jangling, or else a general jam; therefore, the big end of the radial

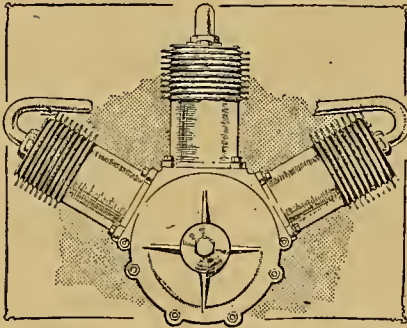


Fig. 1.—Front elevation of fan type three-cylinder Anzani engine.

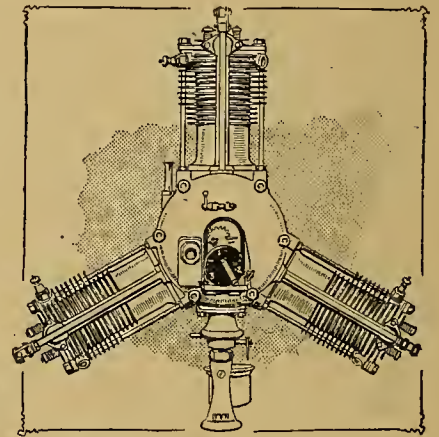


Fig. 2.—The Anzani Y pattern. By so arranging the cylinders better balance, of course, was obtained.

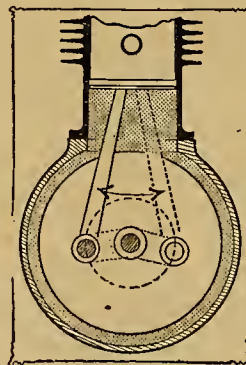


Fig. 3.—Rocking angle of Triumph connecting rod.



## About Aero Engines.—

engine under consideration is prevented from rocking by an epicyclic gear, which locks it absolutely steady, and enables the crank pin to receive the power impulses without flinching. The need for this is evident when we consider that the force of the explosions in the nine cylinders acts upon the crank pin along the lines shown by the nine arrows in fig. 4. Fig. 5 shows a simplified end elevation of the big end assembly. A

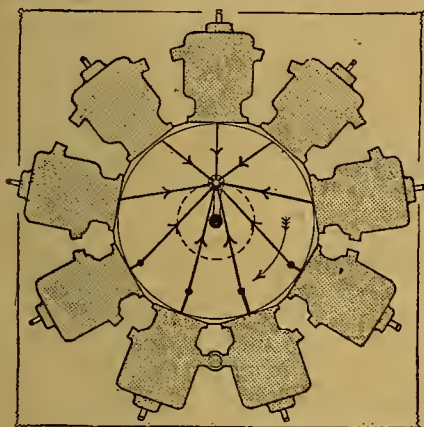


Fig. 4.—Angle at which power impulses impinge towards crank pin.

steel cage rides on two large ball bearings on the crank pin. The cage is formed with two parallel discs of the same size, in each of which nine small holes are drilled; thus, nine small pins can be mounted with their ends fixed in the two discs, and to these the real connecting rods are connected, the cage being merely a carrier for the nine pins. Fig. 6 shows the effect of the epicyclic gear, which prevents the cage from rocking. It moves round the crank pin path, but wherever it may be, the same pin, e.g., P, is always at the twelve o'clock position, and the rocking is done by the big ends of the individual connecting rods, and not by the carrier.

Water-cooling is easily arranged without complicated pipes. The pump forces the water in at the lowest points of the two bottom water jackets by pipes branching right and left. Rising to the top of these jackets, it enters the lowest points of the next jacket on each side, and so on, until the right and left-hand streams enter the right and left-hand sides of the top water jacket, and emerge at its summit into a pipe leading to the radiator or radiators (see fig. 7).

Lubrication is similarly simple. The feed pump forces oil along a maze of small ducts which supply oil under pressure to the crankshaft bearings and to the parts comprising the steel cage and connecting rod pin assembly. The oil escaping from the crank pin parts is flung by centrifugal force into each cylinder mouth. As the engine is stationary, external oil pipes to the cam gear and thrust are simple to arrange. Ignition

may be furnished by a magneto of the type possessing a sleeve rotating round a fixed armature. These magnetos give four sparks per revolution, or eight sparks per two revolutions. As a nine-cylinder four-stroke radial requires nine sparks per two revolutions, we have only to drive such a magneto at nine-eighths of engine speed, and the job is done. Actually two magnetos are employed, and each cylinder has two plugs.

Carburation is generally arranged by forming an annular gas box on the crank case, from which separate induction pipes go to each cylinder. The exhaust manifold may take the

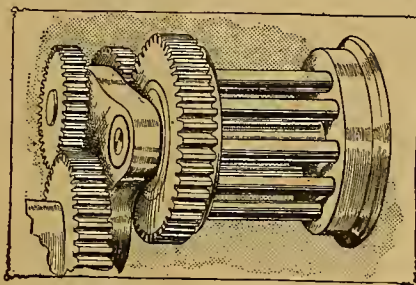


Fig. 5.—Crank pin and connecting rod assembly.

form of a large ring pipe, disposed for cooling purposes around the periphery of the engine, and communicating through short union pipes with each

cylinder. In the air the ports would naturally exhaust directly into the atmosphere.

The valve cams demand a little explanation. If we use a separate cam for each valve the cams will need to be driven at half engine speed in the ordinary way; and yet they must ride on the crankshaft, so as to be equidistant from their respective cylinder heads. This is easily arranged. The cams are mounted on a sleeve, concentric with the crankshaft, and floating loosely upon it. On this sleeve (fig. 8) is a gear wheel A. The sleeve is driven by a second gear wheel B mounted on a shaft placed above it; a third gear wheel C on the outer end of this shaft is driven by a fourth gear wheel D keyed to the crankshaft, and the number of teeth is arranged so that A runs at half the speed of D, i.e., half crankshaft speed.

The radial engine has two special interests at the present time. Now that aeroplanes are getting up to the 300 h.p. engine, we have travelled beyond the existing safety limits of air-cooling, and so cannot always use the rotary. We do not want the weight and length of a V or a vertical engine on scouts, though we can accept them for multiple-seated

machines, which depend for safety on field of fire rather than on speed of manoeuvre. Here the radial comes to our aid; it gives us an engine as short and almost as light as the rotary, but adaptable to greater h.p. than the rotary. It is, of course, quite possible

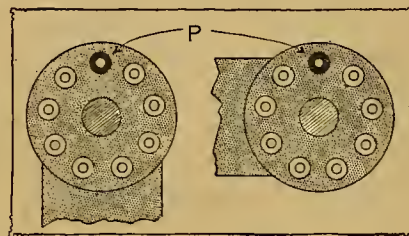


Fig. 6.—Diagram showing that the cage does not rock. The sketches represent the crank pin vertical and horizontal.

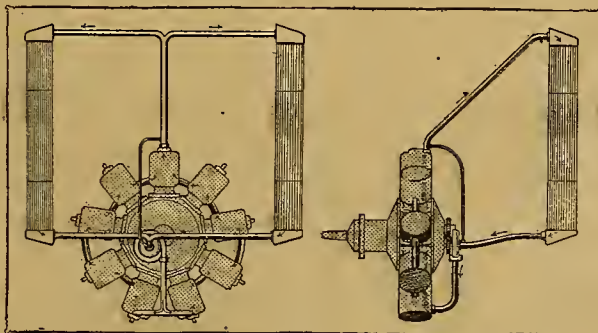


Fig. 7.—The water-cooling circuit of a radial nine-cylinder engine.



### About Aero Engines.—

to build radial engines with more than one throw in the crankshaft; and this may ultimately be done on a large scale. Thus, the biggest aero engine passed by the Censor for public mention is the eighteen-cylinder 450 h.p. Sunbeam, which is of the "broad arrow" type, having three rows of six cylinders each, arranged as  $\Psi$ . (Note.—In present practice the tendency where high-powered aeroplanes are concerned, is to use two or more medium-sized engines; thus, the 520 h.p. German Gotha bombing plane uses two 260 h.p. Mercedes engines, and can get home if one of them is put out of action. But the single-seater fighter, the fast scout, and the racing machine will always desire a light, compact, engine with the minimum of wind resistance. So that ultimately we may see such machines built with a single engine of 1,000 h.p., in which case the radial will retain its present attractions and merits for a long time at any rate.)

Well, if aeroplanes in the future should require, say, 1,350 h.p., we might either elongate the Sunbeam

engine into a fifty-four cylinder, arranged in three  $\Psi$  rows of eighteen cylinders each; in which case it would be frightfully lengthy, and any aeroplane fitted with it would be slow on its controls; or we might get our fifty-four cylinders in an engine *no longer than the present eighteen-cylinder type*, by preferring a six-throw radial engine. In other words, the radial will always be more compact and lighter than the V and the vertical patterns.

Its second interest is that it may possibly prove to be the ideal air-cooled engine for cycle cars and small cars. It can give us 10 h.p. or 20 h.p. at an absurdly low engine weight. It is so shallow that it would hardly require any bonnet room, and we could get our two or four seats in a very short chassis so saving more weight. And, finally, its cylinders would all receive similar cooling, like those of a V Jap twin on a Morgan Runabout, instead of being screened by each

other, as they are on a four-cylinder vertical engine, mounted longitudinally in a chassis, as in ordinary everyday practice.

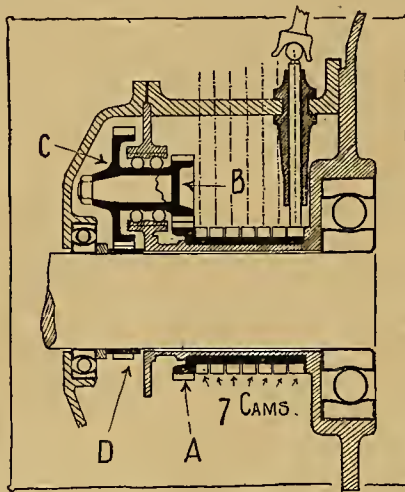


Fig. 8.—Showing the arrangement of the cams.

## Engineers' Dinner in Birmingham.

ON Saturday, the 15th inst., a dinner at which well over 200 Birmingham engineers—practically all those in the Midlands dealing with the manufacture of munitions—were present, was held at the Grand Hotel in that city in honour of Mr. Leonard Ward, late superintendent engineer for the Midland munition area, on the occasion of his leaving Birmingham to take up an appointment in London. Sir Herbert Austin took the chair, and ably conducted the proceedings, alluding in his opening speech to the very pleasant and considerate manner that Mr. Ward had at all times brought to bear in his dealings with the various engineering establishments in his area. Sir Herbert was supported in his duties by Mr. F. E. Baker (F. E. Baker, Ltd.), Mr. J. de Looze (Rolls-

Royce), and Mr. J. G. Newey (Newey Bros., Ltd.).

The names of Mr. Harry Davies (Components Works Secretary), Mr. A. A. Rouse (Superintending Engineer), and Mr. J. H. Roshier (I.M.A. Chief, Birmingham) were coupled with the toast, and each of these gentlemen, succeeding the guest of the evening, responded.

The presentations consisted of a wrist watch for Mrs. Ward and a watch and chain for Mr. Ward, and in presenting the latter Sir Herbert hoped that Mr. Ward would not use it for the purpose of timing contracts.

An excellent musical programme was provided, and the whole event—owing largely to the energies of Mr. E. H. Humphries—passed off very pleasantly.



LONG-DISTANCE BOMBING AND SCOUT AEROPLANES.

The difference in the size of aeroplanes is not always realised when they are observed flying. The photograph will give a good idea of the comparative sizes of two distinct types. The large one is a 550 h.p. Handley Page tractor biplane fitted with a pair of Rolls-Royce engines. It was a similar plane to this that flew to Constantinople. The inset is a fighting aeroplane, and is reproduced on the same scale.



# A Promising Cycle Car Design.

A Four-wheel Cycle Car constructed in accordance with Motor Cycle and Sidecar Practice.



Like the question of spring frames, the question of the possibilities of what may strictly be described as a cycle car is one that periodically recurs and demands attention. The subject of the £100 two-seater, four-wheeler, is one that for some years has exercised fascination for motor cyclist and manufacturer alike. A machine that will offer all the advantages of a combination with regard to first cost, cheap upkeep, low petrol consumption, and respectable capabilities in the direction of speed is one that is bound to interest a large number of motor cyclists.

THE two diagrammatic drawings reproduced on this page have been sent to us by Sec.-Lt. C. H. Johnson, R.F.C., and represent a cycle car that he himself has designed and constructed. There are, perhaps, one or two points in

foot room at the front of the seating space, a channel steel chassis, and cross bearers, making construction a very simple matter, 5in. tyres to the wheels, etc. The body is on the most simple lines, though that can also be improved.

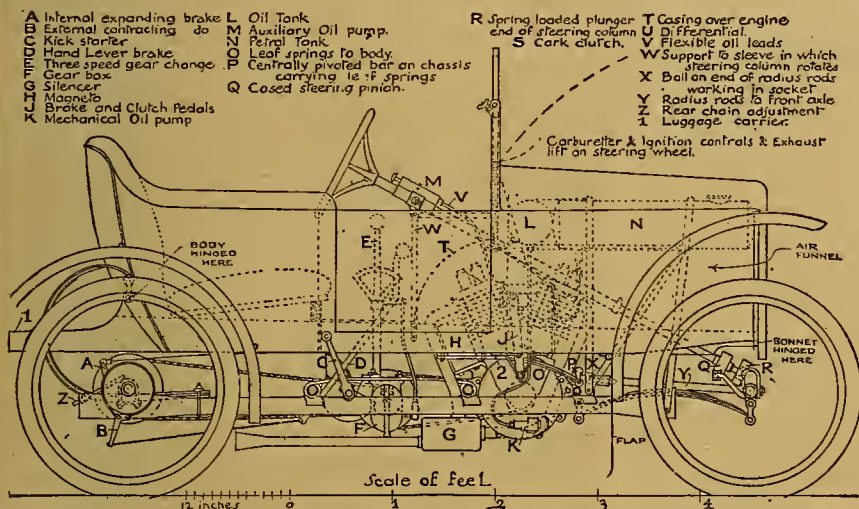
a 6 h.p. engine weight can be reduced to 4 cwt. The cost I put at £100, perhaps less.

The other points are the comfort due to adequate springing; safety, cleanliness, protection from wind and rain, and accessibility of all parts. The bonnet hinges at the front and lays bare the engine, carburetter, tanks, etc., whilst the casing T over the rear part of the engine and occurring in the body between the feet of the driver and passenger is easily removable and gives access to the magneto, front chain, etc. The floor of the body at the centre part is also removable to give access to the gear box, clutch, kick starter, hand brake, chains, etc. The silencer can be a real silencer.

The body is built up on two longitudinal bearers, which extend rearwards to form a luggage carrier and forward to take the mudguard irons and bonnet hinge. An iron bar runs through the back of the body, and is provided with bolt ends to fit the links suspended from the C springs. The body is also sprung at the front on leaf springs Q, which rest upon a bar P, which itself is centrally pivoted on the chassis frame. The body, therefore, is supported at three points. Doors will be provided on both sides, and these will accommodate the tools.

## Triangulated Principles in Chassis Construction.

The chassis is the part in which I am most interested, and this is the key to the whole scheme. I regard the failure of



Elevation of the cycle car constructed by Sec.-Lt. C. H. Johnson, R.F.C. It is fitted with a 7.9 h.p. Pope air-cooled engine, and weighs 4½ cwt.

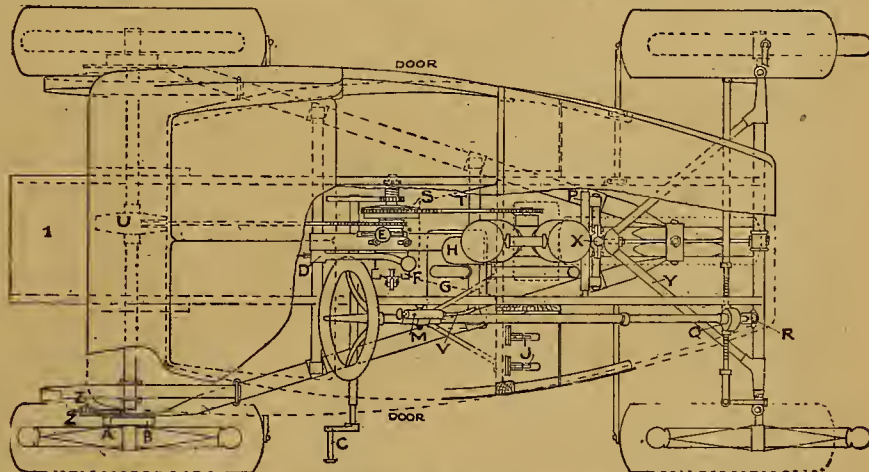
construction that we may emphasise as deserving of particular attention. The springing throughout is on novel lines, and it will be seen that that of the seating portion of the body is practically identical with that of the ordinary sidecar springing. This springing, plus the chassis springing, should give extremely comfortable riding. Steering is by means of rack and pinion, and may be clearly seen in the plan diagram.

The triangulated system of construction, to which we referred in our issue of November 15th, is observed throughout in the frame construction of this cycle car. On the whole we think Lt. Johnson has every reason to be proud of his achievement, which he himself describes as follows:

### The General Lay-out.

"I know the lay-out is not ideal, but in these times it is difficult for an amateur to get any work done at all; but as it stands it is substantially my attempt to solve the sidecar problem. Improvements which I should have liked to incorporate are horizontally-opposed engine, which would give more space for

"With the 7.9 h.p. Pope engine the cycle car weighs 4½ cwt.; this weight is reducible to 4 cwt., i.e., the same as a three-wheeled combination, and with



Plan view of cycle car, showing the general lay-out. Note the triangulated construction of the chassis.



### A Promising Cycle Car Design.—

the four-wheel cycle car as due to the quadrilateral frame, which to be light in weight must be weak in structure. The cross stresses necessitated stronger frames, and the cycle car developed into the light car with extra weight, power, and cost. This design with central front springs and pivoted front axle eliminates all cross stresses, and the rise and fall of the front wheels is halved by the central springing. By this system all four wheels will keep the road, no matter what obstruction one or more wheels have to surmount, and the springing is quite adequate, though I contemplate something better. The steering by rack and pinion with well raked column is very satisfactory, and cannot easily be improved.

"The engine is placed well back in order to shorten the chain drives. The weight is well down, making the carrette very roadworthy. The engine is a 7.9 h.p. Pope motor cycle unit, and is a very fine one, incorporating overhead valves and mechanical lubrication. The gear box is also a motor cycle unit of A.J.S. type with cork clutch and gear change standing up in the centre of the body, as is also the hand brake lever actuating the external contracting band brakes. There are two pedals, one actuating internal expanding brakes, and the other the clutch, both sets of brakes being compensating. The back axle is a light one with chain drive from gear box and with differential incorporated. The wheels should be detachable and interchangeable. Starting is easily effected by the

sick starter, a much better way, in my opinion, than cranking.

### Accessibility.

"The body can be swung right up out of the way when necessary by detaching the carburettor and ignition controls, as when freed from the crossbar P it can be lifted at the front end whilst the back end hinges on the C spring links.

"The plan and elevation are lettered, and an index provided to show the general lay-out and intention. I have tested this cycle car for about 500 miles only, but have had no trouble whatever. After the war I hope to be able to make arrangements for the manufacture of these cycle cars, as I feel satisfied that with a little more work and thought they can be made 'the goods.'"

## THE CONSTRUCTION OF AEROPLANES.

### Some Suggestions for Improved Systems of Production.

FOR a great many years I have been interested in the subject of aviation, and have often wondered whether the best means are being adopted for quick and reliable manufacture. Briefly, a number of planes are being produced at certain centres, and the components produced hundreds of miles from these bases. Not only that, but the components are made in one place, examined in another, assembled in yet another, and so on, with all the consequent delay. Looking deeper, we find that, taking the City of Birmingham as an example, all parts required for the manufacture of a plane are produced here, from the very smallest pressing to the twelve-cylinder aero engine.

This brings us to the heart of the subject. It is agreed, I think, that Birmingham possesses all the equipment, most of the material and labour, and is adapted to the founding of a huge industry, not necessarily in Birmingham City, but in the immediate district. To bring this scheme into being it would simply be necessary to call together all employers interested in the various districts, and tell them plainly what was expected from them. Also, they would be supplied with a reference room, where drawings could be thoroughly examined. A manufacturer should know that by application to the aero superintending engineer he could immediately get all and every information he required.

Up to the moment the great difficulty in connection with the quantity production of aircraft has been that no set model was available. However, we now have a fighting machine which will be wanted in thousands, and which may safely be produced without the fear of the last thousand manufactured becoming obsolete. Therefore, it becomes necessary to bring a co-operative scheme into being if the machine is to be produced quickly.

### A Central Works.

Tubular construction is more and more finding its way into the realms of aeroplane methods, which means that the bicycle factories of the Midlands will be particularly adapted to the manufacture of this component. The manufacture of

engines should be left in the hands of those houses which have already proved themselves, this requiring highly specialised plant; and the firms making engines should not be diverted by thoughts of wings, fuselage, or detail construction.

Supposing that, under the care of the Superintending Engineer, working in conjunction with the Management Committee of the various Munition Committees, one huge shop were erected, a shop efficient for the reception of the whole of these parts, where they would be passed through Government Bond, inspected, and passed out at the other end for the complete assembly of aircraft. This would mean that at the most twelve weeks after the various manufacturers had received their orders the assembly of the complete machines could be taking place.

### Present Flaws in Co-operation.

At the present time, an idea, however good, has to stand the criticism of an engineer in one or other of the aircraft works at Hendon, who has probably been striving for months to attain the same object. As an instance, a certain bombing machine was constantly turned down for eighteen months by the engineers in charge in London, whereas it has now been found necessary to call a conference of manufacturers at the Air Board Offices to urge that they should go back and work night and day regardless of cost to produce a large number of these machines!

As an illustration of what is meant by co-operation, the Air Board have now entrusted the component parts of this particular machine to about seventy firms, not counting the engine makers, and these firms, in various parts of the country, will manufacture components for its complete assembly at Hendon, miles away from every operative shop. This is not a financially sound proposition.

Another case I might cite is that pressings for engine tappets were ordered in Birmingham by a Coventry house, and despatched to Coventry, where they were simply to be polished and gauged. From there they were redespached to the engine makers in another town, while the steel itself came from Sheffield.

### Some Examples of Co-operative Manufacture.

We have in the Midlands every facility for the production of aircraft in enormous quantities, and as a further example of what can be done by co-operation I will cite the cycle trade, which has achieved one of the finest light engineering feats the world has ever known, in the pedal cycle. Hardly one house to-day builds a complete bicycle; every fitment is specialised in, and the whole are brought into the assembling shop, where they are made into a homogeneous bicycle, and such a degree of perfection had it reached prior to the war that a complete bicycle, minus tyres, guaranteed for ever, could be purchased for 52s. 6d. To carry the matter further, there is the Ford car, which, in its early days, was simply assembled at the Ford shops, of parts obtained from various manufacturers. This alone made the low price of the Ford possible, and the same truth will come to light in aeroplane assembly.

In conclusion, one might mention that the cycle, motor cycle, and car fitters of Coventry have been found to adapt themselves admirably to the swift assembly of aeroplanes. America already has the above scheme in being, and we must move quickly if a fine industry is to be founded in its entirety for the Midlands.

E. H. HUMPHRIES.

### IMPORTANT NOTICE.

#### GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

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## OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

Comments  
and Corre-  
spondence.

LETTERS still reach us bearing upon the subject of British-made machines that are not in accordance with Overseas requirements, but we think that if our

Overseas readers carefully peruse the particulars we have published during the last year of various new military models, they will realise that most of the old objections no longer hold good. Especially does this apply to the higher-powered machines so much favoured Overseas, for thousands of machines coming under this category were built in England to the specification of the Russian Government, which contained stipulations in exact accordance with the requirements of Overseas riders. Ample ground clearance, large wheels and deep section tyres, large capacity tanks, enclosed chain drive and frames of exceptional strength, are the chief characteristics of these machines, and among the makers who declare themselves perfectly satisfied with the results, and who state their intention of retaining similar designs for Overseas distribution, may be mentioned such firms as Messrs. A. J. Stevens, Norton Motors, Ltd., Collier Bros., the makers of the Sunbeam, New Imperial, and many others, so that the Overseas rider will have an ample selection before him.

As regards the spring frame problem, everything possible is being done in this respect, and if British manufacturers appear slow in producing spring frame models it is because the time is inappropriate, or because they hesitate in carrying into practice ideas

which are not up to the general standard of excellence that has hitherto characterised their goods. There will be many spring frames after the war, but similarly there will be many firms of repute deciding, after long experiment, not to abandon the old system, producing spring frame models only for those who demand them. For, though spring frames are highly desirable for the conditions that generally prevail Overseas, there are many men whose riding is, for the most part, over good road surfaces, who do not feel that the extra weight and complication of a springing system is fully warranted for their particular needs, and who would rather put up with a little discomfort than detract in any way from the general handiness of their mounts. We ourselves feel that, though the demand for spring frame models will doubtless be enormous, the light, rigid frame, simplicity type of mount will always retain a high degree of popularity. A good saddle, a spring saddle-pillar, and large diameter wheels are features which assure a reasonable amount of comfort on the average British road—comfort, that is, as the discharged despatch rider of tomorrow will consider it.

✻ ✻ ✻

**Our Lady of the Snows.** IF Canada disappoints us, of one fact we can rest assured, that it is not the true British Canadian that is to blame.

Canada is a cosmopolitan country, and her cities are thronged with a congress of nationalities almost surpassing belief. To realise this one has



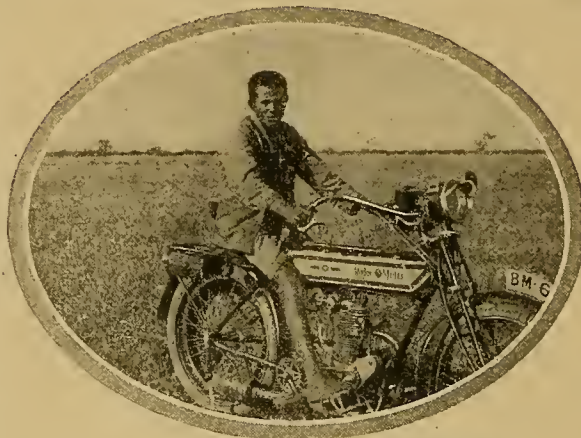
A Triumph and sidecar being ferried across the Zambesi. To find the ubiquitous motor cycle in the heart of Africa exemplifies its growing popularity and unquestionable utility, even in the most outlandish countries.



## Overseas Section.—

merely to walk through the avenues of Toronto, Montreal, or Winnipeg, any evening after working hours, when one is impressed by the variety of peoples that drifts forth—especially in the vicinity of the water fronts of the port cities.

The same thing applies in the forest regions. Some of the camps are mainly British, but in other localities one can travel from settlement to settlement and meet scarcely a soul who can converse in the tongue of the Mother Country. Especially does this apply in Quebec and New Brunswick, though further west it is less noticeable. A Britisher can live in Canada for years without coming in contact to any great extent with the alien element, though it may be seen on every side. The Scandinavians, the Italians, and the French—each nationality keeps to itself and seeks no commune other than its own, living its own life in its own way, unthought of by its neighbours. At a single mine, for instance, various batches of foreigners may be employed, but the gangs work separately and in no way intermingle. In the employment of some of



A Zulu enthusiast aboard a Rudge motor cycle.

the races knowledge as to their different creeds and sects is essential if all is to work smoothly, for it does not even do to mix men of the same nationality if their creeds be different. These are the labour battalions.

Aloof and separate from them all is the true

Britisher, a coolly independent individual, usually a bit of a rover and no little of an adventurer, and if the question of the day were solely decided by these men there is not much doubt as to what would be the issue. The cream of them is already gone, the remainder stand ready to go, as keenly patriotic as any of the Empire's sons. But Canada, shoulder to shoulder with the Southern cities, through which the flotsam and jetsam of the world's adventurers have drifted for centuries past, is confronted with difficulties from which Australia, for

instance, is free, and those familiar with the Dominion were by no means surprised at the turn of events. The surprise lies in the fact that one who takes freedom as the basis of his oratory, should fail to realise that only by unity with the Mother Country can freedom be finally assured, not only for his own beloved land, but for the whole civilised world.

## A Selection of Letters from Readers scattered all over the World.

### Profiteering in Natal.

MR. J. W. DEWAR, 347, McDonald Road, Durban, comments upon high prices in that country:

"Seeing in the latest number of *The Motor Cycle* to hand a complaint from a reader re profiteering in motor cycle spares, I thought I would write and acquaint him and others that England is not the only place where such profiteering is in vogue.

"Recently I had occasion to get a new back cylinder for a 6 h.p. Clyno, and I was charged £7 18s. 6d., not including railage, and £3 2s. 6d. for a new connecting rod. These figures, as I think all will agree, show more than a fair profit to the seller.

"I can confidently state that the question of prices of spare parts in this country is one of the chief deterrents to riders buying British machines, and, moreover, the majority of agents, owing to the war no doubt, are carrying practically no stock of spare parts, and, according to my own experience, those that they have are very high-priced.

"England will have to make a big move to recapture the motor cycle trade here after the war, as the big American twins are getting a wonderful hold, and, moreover, the purchaser of the American machine is practically always assured of spare parts at fairly reasonable prices.

"Your campaign in favour of spring frames is nowhere more appreciated than it is in this part of the world. The ideal touring mount for Natal requires a spring frame, 28in. wheels, plenty of ground clearance, large wide mudguards with plenty of wheel clearance, waterproof magneto, large tank capacity, hand and foot-controlled clutch, chain drive, preferably fitted with a shock-absorbing device, a strong frame, and an engine with a good reserve of power.

"I have had experience with several of the leading British machines out here, and for good hard work they are hard to excel, but considering that severe road conditions, freak hills, water splashes, rough surfaces, etc., are quite the order of the day when one does any touring, I find that the spring frame Powerplus Indian outfit which I now have is far more comfortable, and has many advantages over most Britishers.

ALG

"I am not belittling the British machines—far from it—but I hope that *après la guerre* the home manufacturer will turn his attention to a suitable Colonial model, and insist upon agents carrying a stock of spares at reasonable prices."

### American Machines in Canada.

W. T. EVANS, of the Sphinx Mfg. Co., Urbain Street, Montreal, replies to correspondents: "The writer has read with interest the letter from your Toronto correspondent, relative to 'Post-war Ideals,' and would like to reply to him—and others—through your valuable paper.

"Let Mr. Warne not be at all dismayed, or even anxious, as to the present and future intentions of the British manufacturer connected with the industry. Because British interests do not at the moment show their hand, that is no criterion or indication that the important question of Overseas trade is not receiving due and careful thought; furthermore, let it not be thought, or understood, that a policy of procrastination is the order of the day.

"The ability of the British manufacturer to rise to any and every occasion has been ably demonstrated during the war to an extent hitherto unheard of or accomplished before, and is the envy and admiration of the whole world. The fact that in pre-war days the British manufacturer—taken in the aggregate—had sufficient home trade to take care of his requirements is no indication, and must not be taken as an indication, of his future policy.

"Times have changed greatly, and these unusual changes have brought in their trail a more concise and appreciable knowledge of Overseas peculiarities, requirements, and demands, and have also brought in their trail a fixed determination by the industry to study and cater for Overseas trade in a manner and way not before undertaken or accomplished.

"This war has taught, and is teaching, us many lessons, not the least of which is the desirability and necessity of closer commercial relationship with our Dominions. To study what they want, and give them what they want, and blend together a happier family with greater commercial activities.



## Overseas Section.—

"Quantity production, plus the usual excellence of British manufacture, is not by any means relegated to the archives of obscurity, and when the industry in England is free from matters of grave importance, more its own master, and free to consider the expansion of British trade within the Empire, it can be taken for granted, and confidently understood that every possible phase of the question, careful thought, the best of skill, and the intensive force of commercial activity will be in evidence to cater for the requirements of the country wherein British goods are sold.

"It is known and readily understood that British makers of motor cycles stand supreme in the world to-day for all-round excellence. That these makers will cater for Overseas usage can also be understood, if not generally known, and the writer can assure Mr. Warne that the day is not far distant when British goods, comprising conformity and adaptability, reasonable prices and genuine and satisfactory service, will not only be the order of the day, but the order of every day.

"Be of good cheer, Mr. Warne—do not be either surprised or disappointed at what seems apparent neglect. The British manufacturer may appear to be dormant, through necessity and matters of great national importance, but in reality such is not the case. He is very much wide awake, and in due course and at the opportune time British commercialism will be in evidence, and those who may be prone to judge the future by the past are likely to commit an error of judgment.

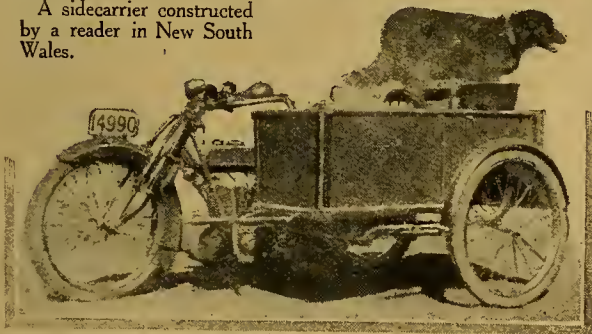
"The British manufacturer always moved slowly, though surely and steadfastly. To-day he is moving very fast—faster than he ever moved in his life—and he will not go back to former slow and conservative methods, the resultant effect of which will be that Canada and our other Colonies will reap the benefit that will accrue from the 'reawakening' caused by this war.

"Many home truths have been brought to the British manufacturer's notice, many of which were not at all palatable. He now sees with clearer vision, and can be depended upon to act accordingly."

## A Dog's Sidecar.

MR. W. ROHRMAN, writing from Kahoomba, N.S.W., Australia, says: "I enclose a photograph of my side carrier, which I call the dog box. I usually take the retriever when no other cargo is available. In your various issues of *The Motor Cycle* I have gleaned useful tips. I constructed the side box for business use, it being strong and suitable

A sidecarrier constructed  
by a reader in New South  
Wales.



for my work. It weighs 40 lb., and, with a load of 3 cwt. in it, is quite enough for 3½ h.p. to pull up hills. It is adaptable for a passenger when I have no time to change over to wicker body.

"I notice in your issue of May 3rd reference to Timken roller bearings. I have found these the finest bearings I know of for horse vehicles, and certainly think they are the motor bearings for the future."

## From South Australia.

MR. WILLIAM COULTAS, Beltana Station, S. Australia, writes: "I take *The Motor Cycle* as regularly as it can be got out here, and get useful information from it. I ride a 4½ h.p. B.S.A. all chain driven model. It stands up well to the rough conditions here, and the roads round this district are rougher than the roads on the Yorkshire moors. The B.S.A. gear box is a splendid one, and stands the work

it gets remarkably well. I rarely get a stretch of two or three miles without having to change gears, and at times it is nothing but continually changing down and up. I come from Scarborough, and would dearly love to have my machine on some of the perfect roads around there.

"There is no doubt that a really good spring frame is wanted for these parts, one that will stand all the shocks of going over creeks, gutters, and stones. There are no road makers in this district, and what repairs the road gets we do ourselves. I do not know too much about a motor cycle, but I rather think that, provided the spring frame is really strong, the post-war Matchless should prove an ideal machine for the Colonies. The only trouble I have with my B.S.A. is breaking spokes. These, curiously, are alternate ones, running the same way, on the sprocket side of the rear wheel.

"Wishing the 'Blue-un' the best of luck."

## The Belt-driven Single in India.

CAPT. A. A. PALIT I.M.S., Calcutta, writes: "One is always interested in 'The Critics' page of *The Motor Cycle*. I think motor cyclists in India and Australia would be interested in a discussion about the best type of motor cycle suitable for these climates.

"Personally I think that the standard British single-cylinder belt-driven machines are still the best for India, even for light sidecar use."

## The Necessity for Ample Ground Clearance.

"AUSTRAL," now in France, airs some views on the question of design: "*The Motor Cycle*, dated 25th October, came to hand a few days ago. I am glad to say that the old 'blue cover' is obtainable in the larger towns here, though we have to pay double price for it. I have read with great interest the discussion on Overseas models. I am an Australian, and have travelled nearly all over Australia per motor cycle. I have tried almost every make of machine, but the only one that was any way suitable was the Indian—simply because of its high clearance and spring frame. The Indian, however, would not stand up to the work, so I had a special machine built. This comprised a spring frame of my own design, fitted with Druid front forks, a 6 h.p. J.A.P. engine, and an A.J.S. countershaft gear. I really cannot say too much in praise of this fine engine; it is undoubtedly the best engine I have ever used, and, as I said before, I have had a very great experience with motor cycles, and have travelled over some of the worst roads in the world. I cannot understand why the English manufacturer will not take the trouble to study Colonial needs, for the British machine has proved itself to be far ahead of the American in durability and cost of upkeep.

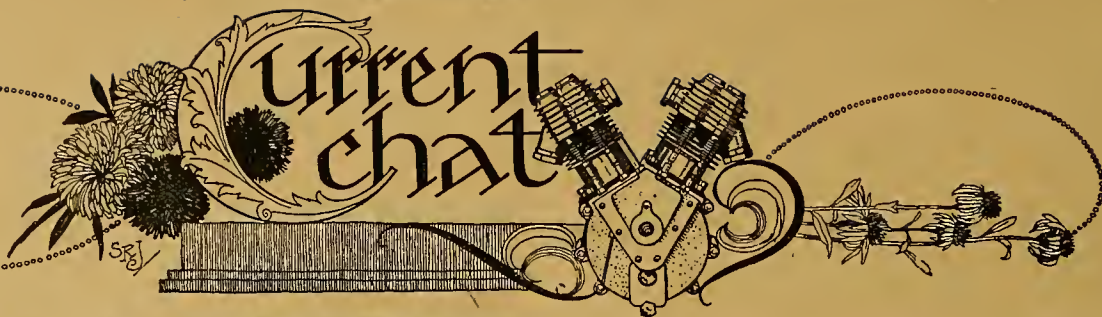
"Why do not manufacturers send out men to study Colonial conditions? They would get some idea of Colonial roads if they visited the Somme war zone and travelled along some of the second and third class roads, say about Christmas time.

"The Colonial machine must be of the best material, fitted with a reliable countershaft gear, and, above all, must have high clearance. My ideal machine is: Spring frame similar to Indian, and fitted with latest Druid forks, 28×3in. wheels, J.A.P. engine 6 or 8 h.p., Sturmey-Archer countershaft, and having a high clearance with lowest possible saddle position. The alternative is a 4 h.p. Douglas fitted with latest Druids."

## Price and Weight of Sidecars.

From the REV. A. M. WALMSLEY, Kurunegala, Ceylon: "A line 'in self-defence.' The Brough I rode was a 1916 three-speed model, exactly the same as that described recently by 'Chinook,' and not a two-speed model. I quite agree that with side by side valves and a low compression engine the Brough might be 'quite satisfactory for taking a light sidecar'—in England; but I doubt it in the Colonies, except for knocking about towns. Many people here think nothing of climbing 6,500ft. in a single run—from Colombo (sea level) to the top of the Ramboda Pass, above Nuwara Eliya. We may therefore claim to know something about the respective capacities for prolonged hill-climbing possessed by sidecar outfits of 3½, 4 or 4½, 5-6, and 6-8 h.p. respectively. I would like to thank you for providing, even in the stress of war, when the trade is practically at a standstill, the most readable paper I get."





## Times to Light Lamps.

GREENWICH TIME.

Dec. 27th	...	...	4.25 p.m.
" 29th	...	...	4.26 "
" 31st	...	...	4.28 "
Jan. 2nd	...	...	4.29 "

## Heaviest Traffic on Kent Roads.

According to the annual report of the Kent surveyor, the county roads now have to carry more heavy motor traffic than any others. Over 600 miles of main roads are costing £172 a mile to maintain.

## Entertainments.

The R.F.C. Sports Club (Cudham), which has several motor cyclist members, will hold a dance on December 28th. "The Magnetos," a concert party connected with the A.S.C., M.T. (Sydenham), also announce an entertainment.

## Petrol for Delivering Motor Cycles.

In the issue of the 13th inst., with reference to the delivery by road of motor bicycles which have been sold, we stated that application should be made to the Petrol Control Department, 19, Berkeley Street, London, W.1, for a licence to do so. The Petrol Control Department informs us that in their letter to us on this subject for the word "licence" the word "permit" should be substituted.

## Imports and Exports.

The imports of tyres, parts, and accessories for November amounted to £2,907, being a slight decrease on the previous month.

### EXPORTS.

The export figures, though not reaching October figures, are well maintained. The number of machines sent was 1,594. In November, 1916 and 1915, the numbers respectively were 1,612 and 1,690.

	1915	1916	1917
Number of motor cycles	1,690	1,612	1,594
Value of motor cycles, parts, tyres, and accessories	£124,543	£106,883	£155,607

### PETROL IMPORTS.

There were large imports of petroleum during November, though not quite reaching the October figures. The petrol imports, however, were slightly increased.

### PETROL IMPORTS FOR NOVEMBER.

	1915	1916	1917
	10,254,476	18,004,011	14,269,893

The number of gallons imported during the preceding nine months:

January	...	...	13,001,740
February	...	...	12,257,984
March	...	...	9,246,546
April	...	...	10,258,951
May	...	...	12,270,934
June	...	...	11,327,434
July	...	...	12,346,846
August	...	...	7,853,368
September	...	...	13,278,972
October	...	...	13,887,674
November	...	...	14,269,893

## Sevenoaks Road Smash.

On the Sevenoaks Road during the week-end a Ford car was overturned after colliding with a Canadian ambulance car. Mr. Preston (a Canadian Liberal agent) and a Canadian medical officer were both injured.

## Flying Facts and Theories.

The *Ladies' Field*, commenting on the contents of *The Motor Cycle*, and speaking particularly of "Flying Facts and Theories," says in the December 8th issue: "I think the innovation an admirable one, for after all the motor cyclist is as keenly interested to know something about the relative values of the two systems of cooling as anyone, and, what is more, the average motor cyclist is better qualified to follow arguments of this kind because he is usually familiar with the advantages and disadvantages of both. Mr. Aston, although a technical writer of wide experience, has the happy gift of being able to convey his impressions in simple language that everyone can understand, and that is what makes his contributions to *The Motor Cycle* so interesting."

## Special Features.

FOUR CYLINDERS.

AERO ENGINES: THE RADIAL.

A CYCLE CAR DESIGN.

## Reduction in Price of Petrol.

The price of petrol has been reduced to 3s. 6d. for No. 2 and 3s. 5d. for No. 3 war motor spirit.

## Three-foot Snowdrifts at Westerham.

As a result of the blizzard at the week-end there were 3ft. snowdrifts on the Westerham Road, near the Salt Box. An R.F.C. car dug out of one drift ran into another drift half a mile away. Several cars and lorries were snowed up.

## A Printer's Error.

An error occurred in the formula printed on page 560 of our issue of December 13th in the article on "Spontaneous Ignition," by "P.J.M." The formula should read

$$t_2 = t_1 \left( \frac{P_2}{P_1} \right)^{\frac{n-1}{n}}$$



## JOHANNESBURG-DURBAN RECORD.

The Johannesburg-Durban sidecar record is looked upon in South Africa as the blue ribbon of the road, and great interest was aroused when Messrs. Rosenthal and Reynolds, on a Powerplus Indian sidecar, succeeded in lowering the record made by Messrs. A. W. McKeag and C. Bright on an Enfield in October, 1916. The new time was 13 hrs. 40 mins. being 32 minutes less than the old record.



**The Ex-Henderson.**

In the future, two well-known American motor bicycles which have been sold in this country will be made in the same factory. These are the popular four-cylinder Henderson and the Excelsior. All the Henderson staff and the machinery of the factory were moved to the Excelsior works at Chicago on the 1st of this month. Mr. T. W. Henderson, president of the Henderson Co., will in future act as general sales manager of the joint company.

**Patriotic Investors.**

Mr. George Bennett, treasurer of the Miniature Motor Cycling Club, tells us that this club has now invested the balance of its funds in Tank Bonds, as the best way of disposing of them till the end of the war or afterwards.

This seems quite a good idea, and one other clubs might advantageously copy. The amounts may be small, but every little helps, and it is a good incentive to the individual members of the clubs to follow a patriotic example.

**Huns and Russian Trade.**

Mr. Frederic William Wile in the *Daily Mail*, speaking of German business intrigue in Russia, says: "While Lenin, Trotsky, Krylenko, and their fellow traitors are parleying over peace with Germany, the Hun business leaders are licking their chops in anticipation of monopolising the vast Russian market."

"In 1913 Germany sold to Russia £44,000,000 worth of goods, chiefly manufactured products. The writer in *Voss's Gazette* points out how much easier it will be for Germany to resume commercial relations with Russia than it will be for England, France, or the United States, because Germany is the only first-class trading nation which can communicate with Russia practically altogether by railway. Her rivals require sea transport.

"Germany will start, above all, the article says, with vastly better 'commercial intelligence' about Russia than any of her present enemies possesses. 'Germany,' it explains, 'is therefore also in this direction in a decidedly preferential position. In the Germans who formerly lived in Russia we possess not

only good but numerous intermediaries who know the country more thoroughly than any Englishman, Frenchman, or American—indeed, better even than many a Russian. Properly supported, they will find the way to re-establish our old relations there, which will be particularly useful because some time will probably elapse before we recover our former position in overseas markets. Before the war the German in Russia was a diplomat as well as a merchant. He is sure to prove in good time that he is capable of achieving new and even greater successes."

**Motor Cycle Interests in Denmark.**

Automobile, motor cycle, and cycle trade interests in Denmark will now be looked after by one amalgamated body, which will be known as the Automobil & Cycle-Grosserer Foreningen. Formerly two separate unions were in the care of the automobile and cycle industries, and co-operated with good results, but the definite amalgamation of the two bodies will make it considerably easier to maintain the interests of the automobile and cycle trade in Denmark. The offices of the new body are at 3, Knabrostræde, Copenhagen, under the direction of Mr. Charles V. Nielsen, who fills the office of secretary.

**Of Interest to Gas Users.**

Those motor cyclists who are living in Hampshire within fifty miles of Bournemouth, and who are running their machines on coal gas, will be interested to hear that the Grosvenor Garage, Ltd., Bournemouth, have just published a most useful map showing the coal gas charging stations in the surrounding neighbourhood. The map is drawn to a scale of four miles to the inch, and places where there are special charging stations are marked by black discs, and where gas works are to be found these places are indicated by circles. The back of the map gives a full list of charging stations, with particulars such as the nearest filling station to the particular town dealt with, the position of the gas works, the hours of filling, charges, and size of connections. Thus at Dorchester the charge is 6d. per 100 cubic feet, but double this price after 6 p.m. A 2in. connection is employed.

**R.N.A.S. Work in Pictures.**

"The Work and Training of the R.N.A.S.," published by the Illustrated London News and Sketch, Ltd., 172, Strand, London, W.C.2, 2s. 6d. This book, which is beautifully illustrated, is a companion to "The Work and Training of the R.F.C.," recently published, and reviewed in these pages.

The scope of the book is comprehensive, and the illustrations may be said to cover every branch of the R.N.A.S. activities. The introduction is written by the First Lord of the Admiralty, Sir Eric Geddes. The book should be of particular interest to our readers, so many of whom have joined the R.N.A.S.

**Petrol Prosecution.**

The East Riding magistrates at Hull on Wednesday gave an interpretation of what they considered was unreasonable use of petrol by a doctor. Dr. T. B. Fairley, of that salubrious city, was summoned for an infringement of the Motor Spirit Restriction Order. Mr. G. S. Williamson, who prosecuted, said that the defendant had used his motor cycle and sidecar for the conveyance of his seven-year-old daughter to and from school at Hessle—about five miles from Hull—four journeys a day. He submitted the defendant could have sent her to school either by train or motor 'bus.

The magistrates considered the doctor had infringed the law from want of knowledge as to its interpretation, and fined him £2 2s., including costs.

**Cause and Effect.**

Recently we stumbled across two cheery Australian officers out for an airing—we did not say joy riding—on a Triumph and sidecar. One of these debonair giants was obsessed with a grievance to the effect that the sidecar wheel would lift clear of the road on every left-hand bend—and this despite the fact that his passenger must have scaled something in the vicinity of sixteen stone! "How could he stop the beastly thing?" was his much-vexed question. After a long discussion, these two sporting warriors reluctantly managed to convince each other that "it must be because we take corners too fast." We timorously endorsed the theory.



A group of D.R.'s, with their P. and M.'s, attached to the R.F.C. at their headquarters somewhere in France. The lettered board reads, "Headquarters Despatch Riders, R.F.C. Never known to knock?" Cpl. S. Coleman, who sends the photograph, says the latter phrase is their "motto." A humorous touch is afforded by the question mark.



## SOME USEFUL WRINKLES.

WE have received the following tips from a doctor resident in New South Wales:

"By adding oil to my petrol I discovered that I was losing an appreciable amount of petrol through the joint between the float chamber cap and the body of the Amac carburettor. I sealed this up by wrapping round the joint a strip of gauze saturated in shellac varnish (a leather or fibre washer coated in shellac varnish also makes a good joint when screwing a petrol tap *in situ*).

"The tendency to 'konking,' noticeable in a new single-cylinder engine of fairly high compression, may be minimised by setting the (adjustable) inlet valve tappet to a wider gap than usual. This gives a comparatively late opening and early closing of the valve. As the engine becomes 'run in' the normal setting of the tappet can be resumed.

## Chloroform for Plug Cleaning.

"Here is another 'tip' which might possibly be of use (I have found it to be very good): To clean an oily plug, use *chloroform*. I am the happy owner of two or three Bosch single-point plugs. As your readers probably know, this plug is very easily taken apart for cleaning. A thin piece of hardwood trimmed to a point and a few drops of chloroform soon clean out oil and carbon deposit (methylated ether, a powerful oil solvent, would probably act as well as chloroform).

"Again: A useful little tool for cleaning off carbon deposit from the top of the piston can be made from a long-bladed table knife. Heat the end of the blade to soften it. Turn down about  $\frac{1}{16}$  in. of the point at right angles, and then retemper to harden it. Remove the valve caps and set the piston at top dead centre. Practically the whole of the piston head is accessible to this tool—via the valve chest in the case of the  $\frac{3}{4}$  h.p. Rover. Of course, I do not claim this to be a perfect substitute for the more lengthy process of taking off the cylinder, but it has its uses, within limits. I find that when using Oildag in the engine oil the carbon deposit is quite soft and easily scraped off with this home-made tool.

Appreciation of a  $\frac{3}{4}$  h.p. Machine.

"Another: When priming the cylinder, set one of the valves on the lift. This gives a vent for air in the combustion space, and lets the petrol flow in easily through the compression tap.

"I should like to express my high appreciation of the good qualities of the  $\frac{3}{4}$  h.p. single-cylinder two-speed Rover I am now using. It is a 'staunch mount' in every sense of the word. Among the many good points, I would particularly refer to the big 650x65 mm. tyres, the well-made aluminium chain case, the Coventry silent chain drive from engine-shaft to countershaft and to the magneto, the M-L magneto, with its big fat spark at slow speeds, and last, but not least, the very complete tool outfit included with the machine. The  $\frac{3}{4}$  h.p. Rover is a credit to Coventry, and has made me more than just satisfied with the single-cylinder product of a good British factory. Usual disclaimer."

## CYCLE &amp; MOTOR TRADES BENEVOLENT FUND.

AT the annual general and council meeting of the Cycle and Motor Trades Benevolent Fund, held at the Connaught Rooms on the 15th inst., under the chairmanship of the President (Mr. Ernest Brown), the General Hon. Secretary (Mr. A. J. Wilson) reported that the affairs of the Fund were in a most satisfactory condition, the assets amounting to £33,296, as against £28,959 at the corresponding date last year, while the membership roll registered an increase of 391. Altogether during the year £3,373 has been paid out for the relief of 105 persons.



Sir Charles Wakefield.

One of the most important alterations to the rules was to the effect that firms engaged in the manufacture of aircraft machines or engines should be deemed to form part of the motor trade, which will have the effect of extending the scope of the Fund to a considerable extent.

## Sir Charles Wakefield.

At the Council meeting Sir Charles Wakefield, who was recently one of the most popular and benevolent of the Lord Mayors of London of recent times, was universally elected president for the ensuing year. Sir Charles Wakefield is sole proprietor of the firm of C. A. Wakefield and Co., which is so well known in the motor world in connection with Castrol motor oil. Sir Charles Wakefield has done an enormous amount of good work in the direction of charity, and is the possessor of many honours and decorations. Among them may be mentioned the Order of Mercy and the Order of St. John of Jerusalem, the Order of Officer and Commander of the Legion of Honour, and the Belgian Orders of the Crown and Leopold. Sir Charles Wakefield is a supporter of the Imperial Cadet movement, in which the late Lord Roberts took such a keen interest. He is also Honorary Colonel of the Imperial Cadet Yeomanry and Honorary Colonel of the London Royal Garrison Artillery. In addition he is a Mason, and holds the rank of Past Grand Junior Warden of England.



GASBAG COVER.

A wicker gasbag cover made for use on lorries. Though not likely to be of very great utility so far as all motor cyclist users of coal gas are concerned, it may suggest to some a means of protecting the container from damage.

## THE GOVERNMENT AND PLUG DESIGN.

IN the issue of December 15th, page 565, we made reference to a rumour which suggested that the Government officials responsible for the design of sparking plugs were contemplating the employment of one standard design of plug for all purposes.

We have since had an opportunity of seeing part of the very large work which is being done by the Air Board on the design and production of sparking plugs. A great deal of experimental work has been continuously carried out on various engines, and the closest co-operation exists between the Department concerned and the leading manufacturers of sparking plugs, and it is undeniable that the present design of plugs is a very great advance on the plugs of even a year ago.

The increasing efficiency of aero engines, which often means increased heat, also throws a very severe strain upon the plugs. In many cases a sparking plug that is Class I. for transport work will not stand up on a good aero engine for more than two or three minutes.

We are very glad to be able to subscribe our testimony to a branch of engineering which certainly seems to be receiving the best possible attention of a Government Department.

## THE TRIUMPH CYCLE CO.'S BENEVOLENT FUND.

A TYPICAL example of what the working men of Coventry in the motor engineering trades have done and are doing by way of mutual benevolence is furnished by the Triumph Employees' Sick and Dividend Society Benevolent and Hospital Funds. The balance-sheet of the society for the past year—the twenty-seventh year of the society's existence—shows that during the year £2,278 14s. 2d. has been raised and spent upon various charitable objects, including, amongst others, the following: Parcels for soldiers, £1,000; maintenance of seven beds in the local hospital for soldiers, £225 16s.; St. Dunstan's Hostel for Blinded Soldiers and Sailors, £75; British and Foreign Sailors' Society, £26 5s.; Y.M.C.A. huts, £20; Red Cross ambulance trailers, £17 10s.; the Mayor's Local Fund for supplementing the separation allowances to soldiers' families, £130. During the continuance of the war, i.e., since 1915 to the end of the last financial year (November 10th), £4,524 4s. 4d. has been raised for various benevolent purposes connected with the war, including the following: The Mayor's Local Fund, £265 6s. 3d.; Prince of Wales's Fund, £361 9s. 8d.; Soldiers' and Sailors' Flag Day, £125 5s. It is only fair, in view of the manner in which the good name of the working classes of Coventry has been heshmirched of late, that facts such as these should be mentioned. This is by no means a solitary instance of philanthropic effort of this kind. Indeed, many works could probably show a better record, indicating that the spirit of mutual help and generosity is strongly in being among the munition workers.



# WITH THE MOTOR CYCLE IN THE HOLY LAND.

## A DESPATCH RIDER'S DISILLUSIONMENT.

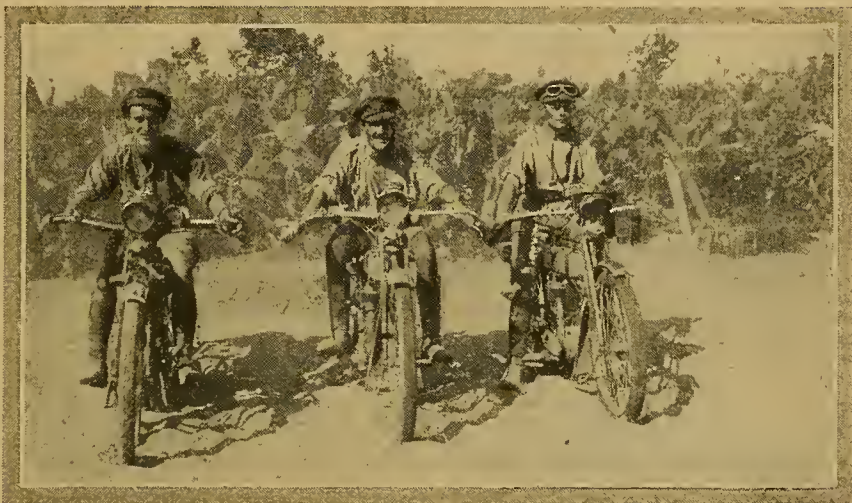
THE following brief and picturesque account of the life of a D.R. in Palestine has been received from J. B. Gurney Grice:

"The country so far has been rather disappointing after expecting to find a land flowing with 'milk and honey.' I certainly have seen a few cows which might pass under that heading with profuse apologies, but have not yet tasted any fresh milk; as for bees, I have not even seen an 'orphan.'

"I must admit, however, that after seven months wandering in that awful waste known as the Sinai Desert the country appeared as the green fields of Elysium, much of the land being green with sprouting corn and grassy plains, reminding one of home and better times. But now heavy transport of all kinds has cut up the land in places where one used top gear, and it is reduced to a bumpy low-gear grind.

"Green fields have disappeared, and one can always tell where the ploughed fields were on account of the back wheel doing its best to reduce one to pulp.

"The natives in the villages use cactus plants for making hedges and enclosures, and on a moonlight night the curious shapes of the leaves present a weird and ghostlike spectacle. The dwellings are made of clay and mud, strengthened by stones, rocks, and



The "hedges" of prickly pear are a feature in some parts of Palestine, the curious foliage of which will be noticeable in the background of the three despatch riders.



A road in the Holy Land. The insistent features of the landscape appear to be sand and prickly pear.

branches of trees. I have noticed one other kind of dwelling, which had a thatched roof. The particular cowl I am thinking of was quite close to our camp, and was supposed to harbour vermin. We burnt the

cowl down one afternoon, and later, on looking through the debris, we found a Turkish sword, some small arm ammunition, and an old metal plate. In the floor there was a hole filled in with tiffin and grain. We scraped and dug it out, and at the bottom there were the remains of a female's garment. We accordingly searched this, and discovered some coins sewn up. When the owner of the cowl returned his face represented anger, disgust, and revenge; it was in truth a study.

"Overheating, burnt-out valves (exhaust, of course), gudgeon pins working loose and scoring the cylinder, broken frames, gear pinions wearing, and lastly, tyre creeping and tearing out the valve—this last trouble has been overcome by fitting security bolts. The whole or greater part of the gear box trouble can be overcome by fitting

a different system of change wherein fewer working parts are used and longer arms, which neutralise the play caused by small pins wearing. We should like to see several improvements in the Triumph—a more satisfactory spring fork, the gear operating mechanism improved, larger tyres, and stronger rims and other minor points. Petrol consumption works out about 25 m.p.g., and oil at 100-120 m.p.g., depending upon the conditions of the roads and tracks. We are living in bivouacs and dugouts, and are as comfortable as circumstances allow. We have given up hoping for a change for the better."



A village in Palestine. J. B. Grice, who sends the photographs, says the land does not flow with "milk and honey." Judging from the desolate aspect of the scene one can well believe him.



# JOIN UP NOW.

## THE A.C.U. AND ITS WORK DURING THE WAR.

THE motor cyclist who is left at home, whether he is still able to use his machine or is waiting for the happy days to come when he can ride again without let or hindrance, and the rider serving in H.M. Forces abroad, are often led to ask themselves if it is really worth while for them to continue their subscriptions to the motoring institutions. They seem to feel that, as they cannot use their machines, and as they cannot receive, so far as they can see, any benefits, the few shillings expended on the subscriptions are best saved for another purpose. We fear these gentlemen do not in any sense realise the work that the only body which caters solely for motor cyclists—the Auto Cycle Union—has done for them while they are fighting their country's battles abroad or at home.

### The A.C.U. needs you—you need the A.C.U.

The Auto Cycle Union, 83, Pall Mall, London, S.W.1, needs members, and motor cyclists need the Auto Cycle Union. Unless they are represented by a powerful governing body motor cycle riders will be quite unable to tackle the problems which will come before them after the war. There is still a great deal to be done as regards legislation in making the motor cyclist's lot a better one, and, in consequence, every single rider who can afford to buy a two-gallon tin of petrol should invest 5s. in the Auto Cycle Union, and a very fine investment he will find it.

Members of the Auto Cycle Union receive benefits in two ways: individually, by enjoying certain personal privileges, and collectively, by the protection afforded against undue interference on the part of the authorities, and the encouragement of everything which helps the progress of the pastime. It must be remembered that all motor cyclists, whether members or not, benefit by anything that the Union has been able to do in protecting and encouraging the movement, and consequently it deserves to be and should be supported.

### Personal Benefits.

Let us consider for a moment the personal benefits offered by the Auto Cycle Union for 5s. First we have the Road Guides; very useful in times of peace, but, with few exceptions, they have naturally had to be withdrawn during the war. Secondly, Free Legal Defence. This is the most important privilege of all. A solicitor's services are costly, whereas for a yearly subscription of 5s. a member of the Union is defended in a police court free of charge, and without trouble to himself.

Then there is the question of free legal advice and assistance, and we can take a few instances in which the Union has successfully fought for its members, and, in some cases where a general principle was involved, for non-members. There is one case of a lieutenant in the army who was travelling on his machine over a freshly-tarred road, sideslipped, and completely ruined his uniform. Thanks to the offices of the Auto Cycle

Union he was able to obtain damages from the local county council responsible.

Then there was the case of a deaf motor cyclist who was refused a driving licence (quite irregularly) by a local county council. Here the Auto Cycle Union succeeded in procuring the licence for him and in making the local council see the error of its ways. Then came the case of a youthful driver at Blackburn who was summoned for driving a sidecar combination (which the magistrates called a car) when under seventeen years of age. Although through an error he lost the case, the Auto Cycle Union took the matter up, and advised the driver to continue using his machine and to invite prosecution on the part of the police, when they would defend the case free of charge as being one of general interest to the motor cycling community. It was so obvious that the Auto Cycle Union was in the right and that the police were in the wrong that no further action has been taken against this motor cyclist. A more recent case, which the Union is now engaged in taking up, is one of the exemption from the local taxation licence of newspaper boys who are drivers of sidecar combinations in London. The London County Council has demanded the full licence duties, insisting that these machines, although they are clearly used solely for trade purposes, can only be exempt from licence duty if the sidecar connections are brazed on to the motor bicycle.

Under the heading of Touring we find hotels and repairers. If those of our readers who are not members could see the form of application for appointment they would appreciate the care taken to appoint the right people. After the war the Auto Cycle Union intends to inspect periodically appointed hotels and repairers, so as to ensure that the members are well looked after in every respect.

**INSURANCE.**—The Auto Cycle Union has now the most comprehensive motor cycle policy in existence, reinforced by an arbitration clause for the absolute protection of the insured.

**TECHNICAL INFORMATION AND ADVICE.**—Every day letters are received asking for advice on technical matters, and these are replied to by a practical engineer of fifteen years' motor cycling experience. The Auto Cycle Union also undertakes to inspect and report on machines for members and make purchases on their behalf. During the war many applications for priority certificates have been made on behalf of those wanting spare parts.

**THE HANDBOOK.**—This is a very useful publication, which is sent free to all members, and contains a vast store of invaluable information.

### Collective Advantages.

So much for the individual benefits. As regards the collective advantages, the Auto Cycle Union carefully watches legislation affecting motor cyclists, and instantly takes vigorous action whenever necessary.

As regards taxation, it is not generally known that the Auto Cycle Union took vigorous action when it was intended to

tax motor cycles according to horsepower in the same manner as cars. A complete statement of the arguments for and against the tax was submitted to the Government before the end of April, 1916, and instead the Auto Cycle Union urged a petrol or tyre tax.

Ultimately the Government did exactly as suggested by the Auto Cycle Union, and the benefits which ensued affected not only the motor cyclist, but the motor car owner as well.

### Petrol and Carbide.

As regards the petrol licences and the recently instituted Motor Spirit Restriction Order, it is being gradually seen that the Auto Cycle Union and similar bodies cannot combat the action of the Government, as regards the restriction of the use of petrol in such a way that motor cyclists would be allowed to carry on and use their machines indiscriminately in the same manner as they were used before the war, but the Union's officials have been able to do valuable work in approaching almost daily the Petrol Controller's Department when cases of individual hardship came before them, and they were successful in hundreds of instances in getting petrol allotted to those who really needed it for business or national purposes. Then, when the Motor Spirit Restriction Order came into force, legal opinion was sought, and the Controller was asked to construe the Order more definitely, but up to the present the authorities have proved obdurate, though the Auto Cycle Union is not letting the matter rest, as it is convinced that the position is not such as to warrant police interference with the private rights of the motor cyclist. Prosecutions under the Order have already been defended by the Union with success.

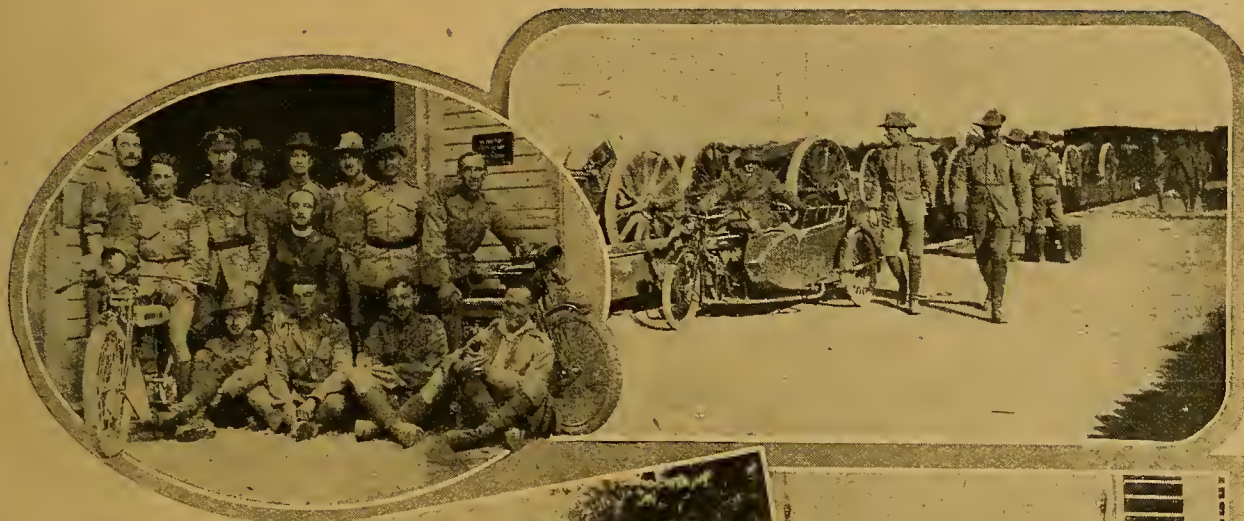
It was announced recently in *The Motor Cycle* that the Government had stopped the supply of carbide for private users. The Auto Cycle Union has now offered to investigate and report upon application from medical practitioners for carbide for lighting the lamps of their motor cycles when on professional journeys at night time, and the Ministry of Munitions has expressed its thanks for this offer, and has announced that such applications for a permit under the Order will receive consideration within the limits of the supply of carbide available.

### Do it Now.

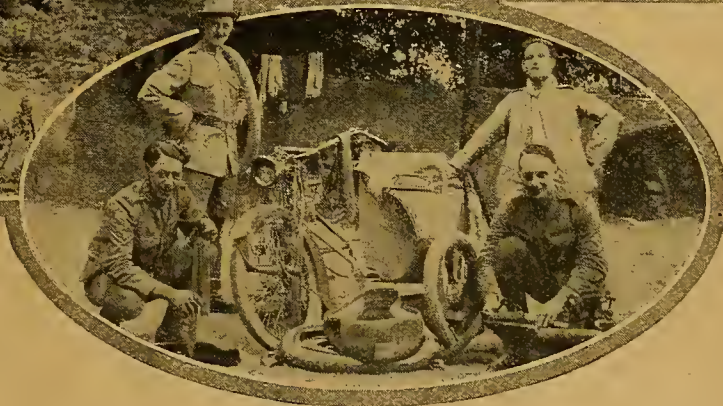
It will be seen, therefore, that the Auto Cycle Union has done splendid work during the war, and has done it under the most difficult conditions, and with a very much reduced staff. When the war is over we shall probably find new conditions; for instance, threats of new legislation as to taxation, roads, lights, fuel supplies, etc., and if the motor cyclists in this country are to be ready to combat measures which will make their lot harder, then they should at once flock in their thousands to the Union, and, whether at home or abroad, keep up their subscriptions so as to enable the parent body to carry on the good work.



# AIDING OUR ITALIAN ALLIES.



Exclusive photographs taken on the Italian Front. It will be noticed that Triumphs and Douglases figure in the scenes depicted.



The upright picture shows Sgt. T. T. Laker, an exponent of Precision engines. The ovals are groups of British and Italian riders, the other prints being scenes on the road near the fighting area.



## A FIRST SIDECAR TRIP.

Expectations and Realisations. Some Sensations of a Beginner.

**I**T was with considerable reluctance that I agreed to spend a holiday in Devon and Cornwall with my friend—a devotee of motor cycling and the possessor of a 6 h.p. machine with, as he assured me, a comfortable and swagger sidecar.

My reluctance was tempered by a sneaking desire to do something out of my usual staid holidaying. Also, there would be a kind of reflected glory in being thought a bit of a sport as I pictured myself, if safely returned, rolling off to my friends those fine oily phrases so beloved of motorists—so many hundreds of miles per day, life of tyres, petrol consumption, gears, sparking plugs, etc., and many others that I have since learned.

Thus, one day I found myself sitting in the train which was to carry me 400 miles from beautiful Scotland (which I might never see again) to the danger zone of Cheltenham. The possibilities of expectant evil were emphasised even by my sister at my leaving-taking. She seemed to me more affectionate than usual on such occasions, and there was a suggestion of forced gaiety when she smilingly wished me a good holiday, with that haunting reminder, "Take care of yourself, and do not go too fast," both of which were almost entirely dependent on the other party—my driver friend.

As the train sped along, sweet Devonian damsels, cider and cream came more into the foreground, yet with still a hazily distant feeling of coming evil in the background.

By the time of my arrival at Cheltenham Station I was quite bold, and jauntily stepped from the train to be welcomed by my motorist friend. He had brought his outfit to the station to give me a foretaste of what I might expect. A six-mile run to his place in the country for the week-end was to be my first experience of the 'bus.

### First Impressions.

I opened the neat little door and stepped into the sidecar, while my friend pulled some kind of lever from a leather pocket and gave a "one," "two" sort of revolving motion with the handle, and the peaceful,



quiet thing roared and throbbed and panted with a "By Jove! let me go or I'll blow your head off" feeling. With a graceful swoop of his left leg over the seat my friend is mounted, and through some foot and hand work we begin to move gently, then a half-arrested quick move-

ment, and finally, with a swish and Honk! honk! we are out of the station gates and off along the road to the rhythmic burr-r-r of the engine.

My friend nonchalantly indicates various interesting bits as we go flying along, but my attention is riveted on the road, and I heed them not. Then, oh, horrors! he actually takes one hand from the handle-bar and pulls out his handkerchief to blow his nose, and I tremble until the operation is over.

### Twenty Miles an Hour!

Next I seem to feel a stronger wind in my eyes and to hear a louder humming in my ears, and I remember my sister's injunction, "Not too fast," so I timidly suggest, if one can do such a thing by means of a "bawl," that he should slow down a bit. With a loud laugh, he roars at me, "Why, man, we are not doing twenty!"

I had done my duty and was now in his hands entirely, so I mentally made a comparative note of the speed, judged by the hedgerows, of what "not twenty" looked and felt like.

After dinner we map out and discuss our tour in Devon and Cornwall. I begin to feel nervous again when I am shown the road book and the sectional graphs of some of the roads. Heavens! Porlock and Lynmouth I see depicted like mountains. "Surely we do not go that way, old chap! Cannot we go some other route?" I remark. "Oh, yes! we will manage these all right, although they are brutes, I admit; but I have been over them before."

This was all very well, but I finally resolved I would get rid of these terrors somehow. Other romantic sweet-sounding names familiar to my boyhood's "Westward Ho!" days, such as Bideford and Clovelly, lost all their charm through looking at that confounded, relentless, road book.



The author on his more familiar mount.



**A First Sidecar Trip.—**

That night I dreamt I was cut in two by the lid of the sidecar, and finally tossed over the brink of a precipice into the sea.

**Off at Last.**

Everything connected with our outfit for the tour was ticked off next morning from the prepared lists, and I should certainly advocate the system, for we found a use for almost everything we had foreseen to be possibly necessary without overburdening ourselves. I refer more particularly to things (spares) connected with the machine, although personal comforts are not to be despised in a five days' continuous motor trip.

At 7.30 then we started off for Devon, by repute "glorious," and the straying propensities of various animals—cows, sheep, pigs, horses, etc.—were revealed to me, it being market day at Gloucester. Bristol was reached without mishap, and I was beginning to think that I was enjoying myself.

Something happened at Bristol right in the centre of the town—what motor cyclists speak of as belt

which were thwarted, of catching it in mid-air from my seat in the sidecar. The knocking down of a danger signal on the streets under repair in a busy town (I shall not mention it by name for our number is still readable) tested my nerves, but I was *blasé* at that stage of the tour; we were blessed for twopence by an old lady who was on a foot tour, who addressed us while we were patching a puncture, and for an additional twopence I obtained her best wishes for our patch holding good, which really proved efficacious; these were some of the little amusements, not to speak of the pathetic humour of being passed when at a roadside repair by a ramshackle little cart of the tinker type with the name B. Quick boldly printed on it.

By the third day I had forgotten all about the injunction "Not too fast," and I felt most comfortable in the sidecar when those little levers were hard a-starboard, and when there was a peculiar sound of an open throttle. There was an airy feeling about the movement then, and there were no ejaculations from me of "Steady now!" or "Not so fast," as there were on the first day.



(1) A disused water mill near Lamorna, Penzance. (2) A pretty spot where the author had a day's respite from sidecarring.

trouble. The belt broke, as many others do, through excessive strain, but was most expeditiously repaired by my friend in the presence of the admiring crowd that gathered round.

I felt quite important in handing out the belt punch, screwdriver, etc., and tried to look as if I knew all about it. I think I could do this part now, for that belt was more often "taken in" than I was.

**Making Friends with the Engine.**

I fear my description will develop into a volume if I attempt to detail the many minor incidents. I might just mention, however, that my sympathy was extended, by a wireless message of course, to a distracted calf which disappeared completely in a mad plunge apparently into a deep ditch, and also my admiration to a hen which accomplished what seemed to me the longest flight on record. I had hopes,

I attributed my feeling of safety to the great confidence I felt in the machine, and more particularly to the dexterity and care shown by my pilot. Although attaining great speed at times he took no senseless risks, points which were quickly noted by the novice in the sidecar.

I began to get quite friendly towards his engine, for never once did she falter (I believe I am right in attributing the feminine gender), and I felt myself sympathetically throbbing to her tune and, figuratively speaking, patting her back for being such a good girl. As we rushed at and ascended the hills, I was with her all the time, and felt quite sore and pained when she was very occasionally and reluctantly put on the low gear. I never could get rid of this feeling of sympathetic strains to the machine, and after a day's run felt quite as if I had been doing a



**A First Sidecar Trip.—**

long walk, my muscles being more or less taut all the time.

One incident more and I shall briefly enumerate the line of route taken and completed without mishap and then conclude. The incident is connected with my strategy in endeavouring to escape the sectional nightmares already referred to, namely, Porlock and Lynmouth hills. At Minehead, whilst waiting for the vulcanising of our inner tube, I suggested we should get over the delay by taking the steamer to Ilfracombe—quite a subtle way of getting over these hills. This was agreed to half grudgingly by my friend, who probably thought it *infra dig.*, and, after obtaining the machine, we proceeded to the pier, which is one of the promenade type with a lower or subsidiary landing pier approached by narrow flights of stairs at each end. This we did not find out, of course, until we had paid our fees.

**Bang goes Saxpence!**

One look showed us that it was not possible to get the machine down without detachment of the sidecar, and even then I should say it was not very safe. I have no doubt the piermaster could or ought to have told us it was impossible, but, probably from my accent revealing me as a Scotsman, he thought of revenge, and took 1d. from us and 10d. for the cycle and sidecar.

On the return from our promenade with our lady love still in tow, I asked him to refund the money on

her. But no! the illogical fellow said he would let her off for 5d. My vulcanising gave way slightly here again, but I was worsted all the same, and what worried me more was that Porlock and Lynmouth loomed nearer than ever. I do not know whether to be obliged to the gentleman in a garage who directed us a route *via* South Molton, for this road, though escaping the two deadly hills I dreaded, was about the vilest road you could imagine. I offer him my apologies if we misconstrued his instructions, but it was an unkindly act.

Bideford, Clovelly, Bude, Truro, Redruth, Penzance, all came in our line to Land's End, and in a little place—Lamorna Cove—eleven miles from Land's End I had a most welcome respite of one day from the sidecar tension, and my friend a well-earned rest from his driving.

From Lamorna Cove (sweet sounding name) to Torquay the next day, and from Torquay to Cheltenham, *via* Exeter, Glastonbury, Wells, etc., the last day, completed our five days' tour. Something about 620 miles for my first experience in a sidecar I think is not a bad record.

My sincere friend the engine, like most ladies, faltered a little when nearing home, but we did not need to take her arm, and by a little judicious coaxing and caressing we swerved round that gate again.

I have no objections nor reluctance to accept invitations now on any reliable sidecar jaunts, but I have lost the innocent title I bestowed upon myself for the purpose of this article.

THE NOVICE.

## ABOUT SPEED GEARS.

### A Criticism of "Ixion's" Notes on the Question of Four-speed Gear Boxes.

"IXION'S" remarks disparaging the employment of four-speed gear boxes, and intimating that so many gears are an unwarranted adornment, have caused me intense pain; but what is surely astounding is that he quotes the A.B.C. in order to illustrate his point! Now if any engine on earth demands a four-speed gear box it is the high revving, highly efficient variety, and if "Ixion" does not appreciate this fact it is because he has forgotten what it is to ride the same type of engine with only two or three gears, or because the ratios are all wrong for the country in which he rides.

I seem to recall that in his early days of possession "Ixion" spoke with some enthusiasm of the marvellous results rendered possible in the A.B.C. by its revving capabilities combined with its four-speed gear box; at that period his memory of three-speed machines was evidently a little fresher than it is to-day, and he was, therefore, able to appreciate the value of the four.

For months past most of us have been attempting to emphasise the necessity for four gears with engines of the revving order, for only by possessing this choice of gear can one employ a third and a fourth ratio fairly near together, and it is, therefore, somewhat astounding that our fertile and usually highly practical friend should shoot off at this tangent—a thing he has not been unknown to do before.

In my opinion the point in which the A.B.C. scores most noticeably over the Brough is in the possession

of that extra gear. If "Ixion" does not appreciate this fact I think a few rides on a Brough after becoming used to his A.B.C. would serve to convince him. My Brough machine was geared 4.5 to 1 top, and about 9.5 middle, these ratios coinciding exactly with the A.B.C. fourth and second. The 4.5 was not an atom too high for ordinary riding, but in hilly country the repeated drop into the 9.5 ratio knocked down one's road speed considerably, mopped up one's petrol, and meant unnecessarily high "revs" for a good deal of one's going. Had I possessed that 5.5 to 1 ratio between the two the machine would have been ideal in every respect for fast touring.

### The Question of Decarbonisation.

On the same page, but under a different heading, "Ixion" includes some interesting notes on the comparative carbon collecting abilities of 500 c.c. single and flat twins of about the same capacity, and incidentally this seems to reflect upon the same question. "Ixion" sets down 1,000 miles between decarbonisation as about the mark for the single, and 3,000 for the flat twin. Personally, I have never obtained anything like 3,000 without decarbonising with any flat twin—all my possessions in that line, however, having been two or three speeders. Is it the A.B.C. to which "Ixion" refers as running 3,000 without decarbonising, and if so, may not the elimination of a big stride between the most commonly used ratios have something to do with it?

CHINOOK.



## An Accumulator Lighting Set in Practice.



### SOME NOTES ON WIRING AND GENERAL RESULTS.

SO far this winter I have used an accumulator lighting set which has proved in every way satisfactory. The set consists of head lamp, sidecar side lamp and tail lamp, spare set of bulbs, and a four-volt 40 amp.-hour accumulator of very efficient but not freakish construction.

This set (Ward and Goldstone) differs from many in that each lamp is earthed, and though two terminals are provided, it would, in practice, prove necessary to run only one wire to each bulb. The object of the second terminal, which is merely on the metal body of the lamp in direct contact with the frame of the machine, is somewhat obscure. In my case, however, it has proved very useful, as will be shown shortly.

Each of the lamps is provided with a neat little switch pin of its own, so that, if desired, it can be used separately, and fig. 1 shows at a glance what may be taken as the ordinary way of wiring such a set—each lamp being, of course, connected directly to the accumulator. By this system each lamp is giving its maximum light—and using its maximum quantity of current, and since the side lamp and tail lamp need do no more than diffuse a warm glow—one to show the width of the outfit and the other to prevent annihilation from the rear—this system necessitates an unwarranted consumption of current. The obvious remedy was to run the side lamp and tail lamp in series, so that they would use no more current than one lamp, the head lamp being connected up directly to the accumulator; but the fact that each lamp was earthed, led to the decision that such a consummation was impossible, if simplicity and freedom from the likelihood of breakdown were to be retained. Then suddenly the gratifying fact was realised that the side lamp bracket was mounted on the sidecar body, and therefore insulated from the framework of the machine: so nothing now remained but to wire up the installation as shown in fig. 2, the two smaller lamps being in series with each other and the head lamp

in direct circuit with the accumulator. Thus no more current is absorbed than if merely two lamps were used.

The switches being contained in the lamps themselves—an excellent arrangement not to be disparaged—it is, of course, necessary to dismount from the machine in order to light up, and this proving rather a nuisance, an ordinary electric light switch was fitted inside the sidecar body, adjacent to the rider's hand. Thus, by the present arrangement, the lamp switches are kept always in the "on" position, the main switch on the earth wire only being used—this latter, of course, controlling all three lamps.

A few weeks' experience with this set has proved sufficient to induce me to forswear all association with gas lamps of any kind for the future. Quite apart from the interest of such sets, they are an absolute minimum of trouble, and, so far as I can yet judge, the accumulator is good for some weeks—the lamps being in use about twenty minutes each evening. There is no dirt and no fiddling, the lamps always answering obediently to the switch: and, considering the modesty of present-day lighting requirements, I would prefer this light and simple set to one of the more costly and weighty dynamo sets.

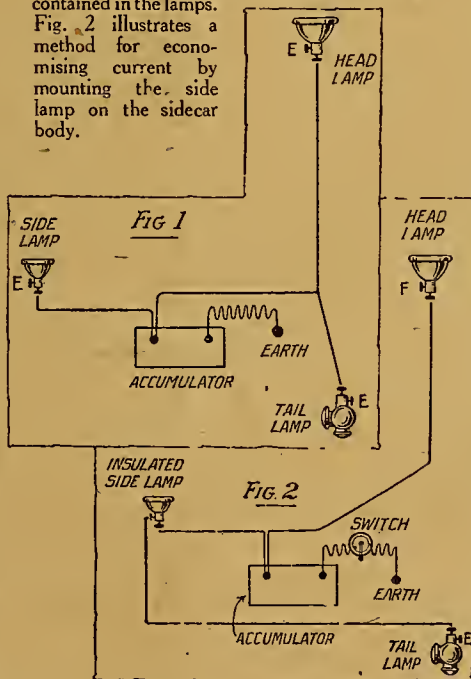
I have fixed the accumulator, which is housed in a strong wooden case, simply by means of a strap, jammed tightly with a bit of an ash tree, inside the sidecar box, and the more exposed wires leading to the lamps are run through rubber tubing—the relics of a bygone age of carbide generators. A half-inch hole

through the bottom of the sidecar permits the passage of the wires, contained in ten inches of garden hose, but I am still hankering after a system whereby, by the addition of another switch and a yard or two of wire, all three lamps can be thrown into series for leaving the machine at the roadside. Perhaps some of the electrical knuts will suggest a system whereby this can be achieved.

CHINOOK.

Fig. 1 shows an ordinary way of wiring on an earthed lighting set, the switches being contained in the lamps.

Fig. 2 illustrates a method for economising current by mounting the side lamp on the sidecar body.





## GOODS MADE IN GERMANY!

Sir,—As a regular reader of your paper, I could not help but notice the letter of Chas. S. Ives, condemning you for your honourable refusal to advertise German goods, and note that he will no longer patronise *The Motor Cycle*. Dear me! I sincerely hope that you will not suffer financially by our friend's sudden decision, and trust this will not cause you to waver in your determination to boycott German goods. Every week I send a copy of your ripping little paper to my husband in Mesopotamia, and to each of my four brothers serving in France; and when I have a few minutes to spare, there is nothing I enjoy more than looking through *The Motor Cycle*, picking up many useful hints which will be of great service to me when the war is over and the Government just a little more generous with the supply of petrol.

I wish you and your paper the very best of luck. And let Chas. S. Ives go to the—Kaiser!  
E.J.H.

Sir,—I am writing to let you know how completely in agreement I am with Chas. S. Ives's letter. I, too, have felt your narrow-minded, un-English notice about German goods to be a deplorable blot on an otherwise excellent and instructive paper. I trust you will revise your policy, or at least refrain from introducing such Prussianisms into a clean sporting journal.

MAURICE LITTLE.

## SPONTANEOUS IGNITION.

Sir,—I have read the article on "Spontaneous Ignition" with great interest, as it confirms points which were raised in "Chemistry of the Internal Combustion Engine." The discrepancy in values for spontaneous ignition temperatures in the two papers is due to the fact that I quoted those of Holm done in 1913, and Mr. Moore's figures are his own, done recently with a greatly improved design of apparatus of his own. However, the numerical order of the fuel values is the same, although the absolute values differ considerably.

There is one point which I consider is not made sufficiently clear, and that is the distinction between "spontaneous ignition temperature of a liquid fuel and the ignition temperature of a gaseous fuel." As Mr. Moore points out, his determinations were made in connection with Diesel research, where the fuel in the *liquid state* is injected into air which is raised to 1,000-1,100° F. in the cylinder, due to adiabatic compression.

I have read Mr. Moore's paper in the *Journal of the Society of Chemical Industry*, and find that his method of determining spontaneous ignition temperature is similar to that of Holm, viz., dropping the fuel in the *liquid state* on to a heated surface until ignition takes place, the temperature of the heated surface being determined pyrometrically.

Now in the petrol engine the aim is to gasify the fuel, and I maintain that there is a great difference between the ignition temperature of a petrol-air mixture in the form of gas and the spontaneous ignition temperature which is found by dropping liquid petrol on to a heated metallic surface. That is why in my article of the previous week (December 6th) I was careful to point out that it was important that the fuel should be properly vaporised, as the ignition temperature of the gasified mixture was 100-200° C. higher than the spontaneous ignition temperature of the *liquid fuel*. In other words, "knocking" or spontaneous ignition is due largely to the presence of drops of *liquid* petrol fractions; the deduction, therefore, is that an efficient carburettor with a hot air intake will tend to prevent knocking.

Firing of the gasified fuel due to high compression will take place, of course, independently of spontaneous ignition of liquid particles.  
S. E. FOX.

LETTERS  
TO THE  
EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents. All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

## PETROL WASTE.

Sir,—I believe that you communicated with the Economy Officer relative to the wastage of petrol alleged by "Fair Play," of Camborne, in *The Motor Cycle* of November 8th. If so, no doubt you have had a reply by now to let you know the result of the Admiralty enquiry into the matter.

I wrote to a man I know on the Petrol Committee about the allegation, as it seemed to me to be too great a scandal to be allowed to continue; or, if untrue, I thought it highly desirable that it should be contradicted.

He writes on December 14th: "It may interest you to know that the Admiralty has reported as to the alleged wastage of petrol on the Cornish coast. It says that the coastguards have no wire-cutters; that wire-cutters are not needed to open petrol tins; that salvage money is paid for the salvage of petrol and oil; and that, therefore, it is not probable that coastguards would waste petrol instead of being rewarded for saving it! In fact, they think we found a mare's nest."

What has "Fair Play" to say about it? NORBURY.

Sir,—My attention has been drawn to the leading article in your issue of November 22nd, concerning the specific case of waste of petrol on the Cornish coast. The official Admiralty reply to the general complaint is the following:

"1. These officers report that wire cutters are not supplied to coastguards, and that they do not believe they are employed for the purpose stated by your informant. In confirmation, it is pointed out that large awards of salvage money have recently been made for quantities of petrol and oil, salvaged on the Cornish coast; and that it is obviously improbable that the coastguards would throw away an opportunity for obtaining similar awards. Incidentally, it may be mentioned that a petrol tin is easily opened without a wire cutter.

"2. In these circumstances, it is considered improbable that there is any general foundation for the report received by you, and I should therefore be much obliged if you would make further enquiry from your informant as to the exact grounds for his statement."

If your correspondent will communicate with me, giving date, hour, place, and the fullest information in his possession, I can again take the matter up with the Admiralty, and I can withhold your correspondent's name if he desires that course to be followed. E. S. SHRAPNELL-SMITH,  
Economy Officer.



**COAL GAS AS A FUEL.**

Sir,—I have read with intense interest the various articles which have appeared from time to time in *The Motor Cycle* on converting motor cycles to run on coal gas.

As it is the only fuel left to motorists just now, and as I am very desirous of converting my machine to coal gas, I shall be extremely happy to have a little definite information from your readers who have had experience with coal gas. What are the advantages and disadvantages? I have made endless enquiries about gas, and may say that every time I get puzzled more and more. Some strongly assure me of the best possible results, others absolutely the contrary. Therefore I am left irresolute at present. In view of all these difficulties and uncertainties, I should be very glad of any real reliable advice, to enable me to convert my machine with much more confidence. Can it possibly be true that the Government is thinking of restricting the use of coal gas, and is it possible that the Government may prohibit the use of it? I hear that this is the intention of the Government.

8 H.P. SIDECARIST.

Paddington, W.

**THE SINGLE V. THE FLAT TWIN.**

Sir,—I have read with interest the recent letters printed in your columns on this subject, and should like to give an opinion if I may take up a little space in your valued paper. I am sure that quite 90% of the D.R.'s in Macedonia will agree with me when I say that the Triumph is the machine out here. I am speaking from experience of eighteen months. In this country, where we have so much rough track riding and such steep gradients to climb, it is essential that we should have a reliable and powerful machine, and in the Triumph we have both these qualities. It has a good "slogging" engine which will take one anywhere, and pull one through thick mud and sand without overheating. The latter fact is remarkable, considering the quality of the petrol and oil supplied to us, and more particularly the latter. Of course, the Triumph is not above criticism, but with more mudguard and ground clearance and a stronger back wheel it would be the ideal machine, in my opinion, for despatch riding. A handle-bar controlled clutch is an absolute necessity in this country, where tracks are of the worst description and gulleys abound. The Douglas has not power enough for it to be of any use on this front other than for "base" work, where good roads prevail, and the fact that it has only two speeds and no clutch tends to make it unpopular as a Service mount with this force. In low gear on a long hill it soon overheats, and once the "revs." are

down one might as well stop at once and wait till the engine cools. It seems very unfair to compare these two machines, so I will quote the following: My machine is an early 1915 model, which, during its thirty months Active Service, has probably done 40,000 miles, and still has the original engine with the exception of the piston and big end rollers. Whilst going down the road to G.H.Q. some three weeks ago I saw an R.E. officer on a late model 4 h.p. Douglas solo. I caught him up, and when he saw me just behind he opened out, blinded down hill and over a bridge, and then took up a long stretch of about 1 in 12 with some rather bad bends in it. Needless to say, he did not shake me off in the slightest, and had I desired I could have passed him at any time. The Douglas roared up the hill in second all out, but I kept in top all the way on my Triumph without any sign of a knock, and took the corners, too.

Our impromptu "dust up" caused quite a little excitement to some M.T. men who were standing by the roadside watching the unsilenced machines come up the hill. I quote this for what it is worth, but if we are successful in getting back to "Blighty" when the war is over I can assure you that quite a number of the D.R.'s of the 28th Divisional Signal Co., R.E., will patronise the Triumph Cycle Co.

Macedonia.

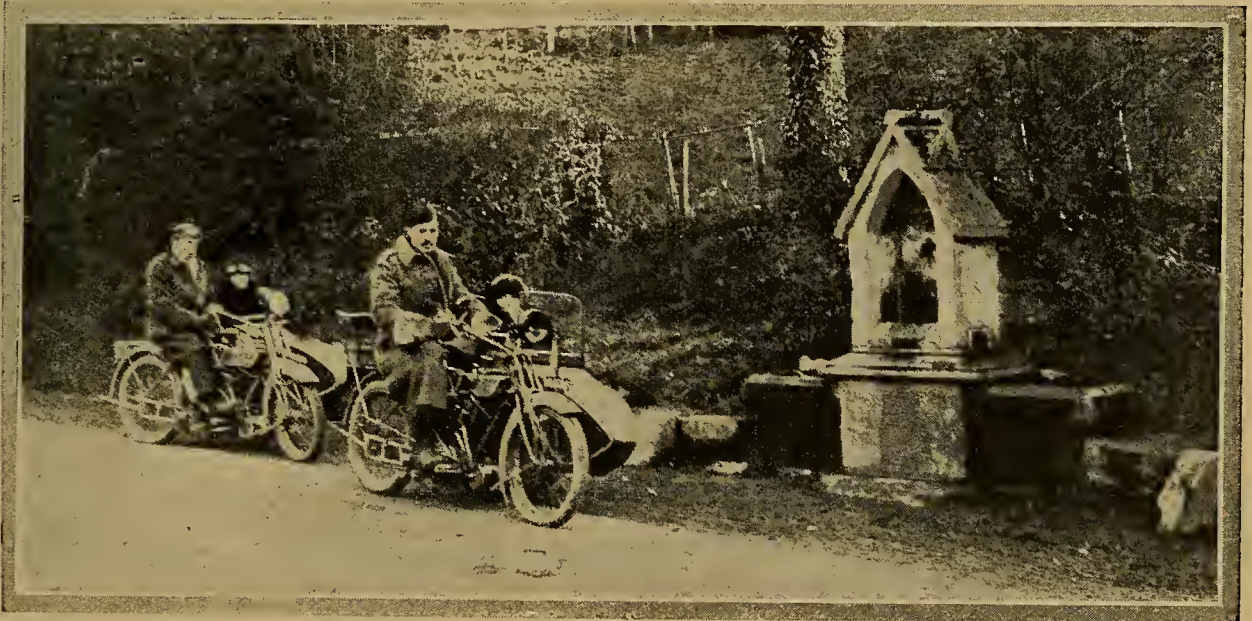
W. LOMAS, CRL., R.E.

**FLYING IN A CURVED PATH.**

Sir,—I have perused with considerable interest the articles by Mr. W. G. Aston, and also the interesting correspondence that subsequently appeared, and I now write to express regret that I cannot agree with certain of your correspondents, notably "F.M.C.H. (R.F.C.)" in your issue of November 29th, and in the issue of December 6th "Dyne" and Mr. A. E. Brittain (R.F.C.) The first two named, I observe, venture mildly to chastise Mr. Aston for the same statement—"When an aeroplane turns it requires more power from the engine if it (the machine) is to maintain its altitude."

I will admit the construction of this phrase is somewhat ambiguous, but the meaning is, I think, fairly obvious to those who will see. However, there are one or two points to which I should like to draw attention, as follows:

Pioneers of the aeroplane industry will remember the early A. V. Roe triplane equipped with a 9 h.p. J.A.P. engine. With this primitive machine (most people will, I believe, admit it was an aeroplane) short straights were possible, but not turns! Again, the early Blackburne monoplanes, with 50 h.p. Gnômes, were also prone to lose height on turns, and the pilot of these machines always got his height on a long straight before attempting a turn.

**ON LEAVE.**

If any men deserve to be considered it is those who are bearing the heat and labour of the war. The scene will recall to many the happy days of petrol plenty, when all and sundry could enjoy the countryside.



Perhaps your correspondent will dissent. I remark that "F.M.C.H." specifies a modern machine. I can, however, cite an instance of this on a machine of official design. The observer of this machine, who, be it noted, is known personally to me, was despatched to another aerodrome across country, to travel, of course, with the machine. A start was attempted, and the machine laboriously coaxed to a height of 3,000 feet. Here a turn was made, and, in the process, 1,000 feet in height was lost! Why?

Undoubtedly, these machines were all underpowered; but, even so, though the loss in high-powered machines may not, under all circumstances, be so apparent, yet, I think, it must still be there. And, if one considers, even a fast scout cannot be slammed round a corner without losing *some* of its speed—a sure sign that power is being lost.

To proceed, although the greater part of "Dyne's" letter is quite irrelevant, there are one or two items worthy of interest.

What precisely is meant by the following: "I was under the impression that the force which deflects a body from a straight path, or maintains it in a curved path, is always exerted *normally* to the direction of motion, hence no expenditure of energy whatever is required to keep the force in operation"?

This appears to me rather ambiguous, and even contradictory; but I must confess I cannot really grasp your correspondent's point. Is "Dyne" aware, for example, that no *single* force can keep *any* body travelling in a curved path? And the last few words, "No expenditure of energy whatever is required to keep the force in operation," are indeed utterly beyond me.

As I do not wish to abuse our privilege of corresponding, I will now pass, rather reluctantly, I admit, to the third and last letter from A. E. Brittain (R.F.C.), who also makes some rather remarkable statements—to quote "Centrifugal force increases with the velocity of the revolving object." Is not this a very loose and misleading usage of the term "velocity"? As for the argument, "The aeroplane must meet the wind," such an idea is quite fallacious, for the flight of a machine depends on its *air speed* and *gravity* (another much maligned term), and quite ignores "wind" in the usually accepted sense of the word. Doubtless, this misapprehension has been promulgated by the oft-repeated injunction of instructors to "get off *against* the wind"; but to anyone with slightly more than "a little aeronautical knowledge" this simply means a convenient method of piling up the air speed whilst still retaining a low ground speed.

I am afraid I must have now strained your patience severely, so I will conclude with the hope that *The Motor Cycle* will continue to print the best of motor cycling news as heretofore. G.E.H.

Leeds.

#### THE TRAINING OF BOYS FOR MECHANICAL UNITS.

Sir,—May I take the liberty of making a slight criticism on your Leader in the issue of *The Motor Cycle* for December 6th? You say: "The first two years of war skimmed the cream of the country's supplies of practical motorists, and 1917 finds us with precious few of the old stamp eligible for active service left. We have to depend now on the schoolboy, . . ." etc.

There are thousands, like myself, who joined the Army two or more years ago, when recruiting for the mechanical sections of the Army was closed. We were patriotic, and joined the infantry. Now my view is: Why waste our valuable petrol for training and giving experience to schoolboys, when there are thousands of men, with several years' motor cycling experience, only longing for an opportunity to transfer? Let the new schoolboys do their bit in the infantry first, and those of us who have done our bit there have the opportunity to transfer. If there is any shortage of motor cyclists, it is only on account of red tape.

May I quote an interesting example? I myself was a despatch rider in a home service battalion for some months, and had received about twelve months' infantry training previously; but because I was in category A I had to teach a man of a lower category, to enable him to take my place. This man had never ridden a motor cycle before, and knew nothing at all about its mechanism.

I must say I am always glad to see my weekly copy of the "Blue Cover," and it was very welcome while in France, and arrived regularly.

Bletchingley.

MECHANICAL FOOTSLOGGER.

#### SPARKING PLUG TESTS.

Sir,—I was very much interested in the letter from the Lodge Sparking Plug Co., Ltd., which appeared in your issue of November 1st.

The above company seem very positive that my so-called "silent discharge" theory is entirely wrong. I cannot, however, agree on this point until some positive evidence is brought forward to prove their contention. I quite agree that the failure of sparking plugs is, in very many instances, due to faulty insulation, but this in no way proves that the "silent discharge" never takes place.

I should like to thank "A.K." for his kind letter, which appeared in the same issue as the above. I had no intention of giving the impression that I considered the silent discharge theory a more probable explanation of plug failure than faulty insulation. As a matter of fact, I consider that faulty insulation is certainly the cause of most failures. Certain plugs with which I experimented gave excellent insulation results, and I intended to express the opinion that such plugs, if they failed in use, did so, possibly, owing to a "silent discharge." I must admit that the very poor behaviour of most of the plugs tested came as a great surprise. I was innocent enough to think that manufacturers would not put on the market such very poor articles. I suppose, however, that even the worst plug would run in a "cool" engine quite well. It is a pity, perhaps, that the make of the various plugs tested was not stated! C. H. STEPHENSON.

#### THE NEW PETROL REGULATIONS.

Sir,—As one of the victims of the Petrol Restriction Order, I desire to point out the evasive manner in which the Control Committee deal with a motor cyclist who desires to comply with its requirements.

I own a combination, and have always had a licence to purchase petrol, but Restriction Order No. 2 prevents me from using it. I am in business as a draper, and my wife is almost an invalid, being able to walk only very little.

I wrote to 19, Berkeley Street, explaining that I desired to know if I could lawfully use my machine for going to the various warehouses; also if I could take my invalid wife out for a short run occasionally as the committee had granted me two gallons per month.

The committee replied stating, "This Department cannot undertake to advise applicants as to the interpretation of the terms of this Order, or as to its application to particular circumstances."

Not being satisfied with this non-committal reply, I wrote to Sir William Marwood, who is one of the Secretaries of the Board of Trade, explaining my requirements, but my letter was passed on to 19, Berkeley Street, and received the following reply:

"Sir,—I am directed to refer to your letter addressed by you to Sir William Marwood of the Board of Trade, dated November 14th.

"In the opinion of the Controller you are entitled to use your motor car for business purposes if the journey cannot otherwise be reasonably and conveniently accomplished. There is no objection to your wife accompanying you when you are driving on a journey permitted by the Order, but you are not entitled to take her for journeys purely for the purpose of exercise or health."

The words "reasonably" and "conveniently" are capable of being misconstrued, for while it may be "conveniently" accomplished it may be considered unreasonably by the Petrol Committee or by the usually badly informed magistrates, who have to rely upon the clerk for an interpretation of the Act. If it is essential to save petrol for the prosecution of the war, why grant licences to purchase petrol to be hoarded up?

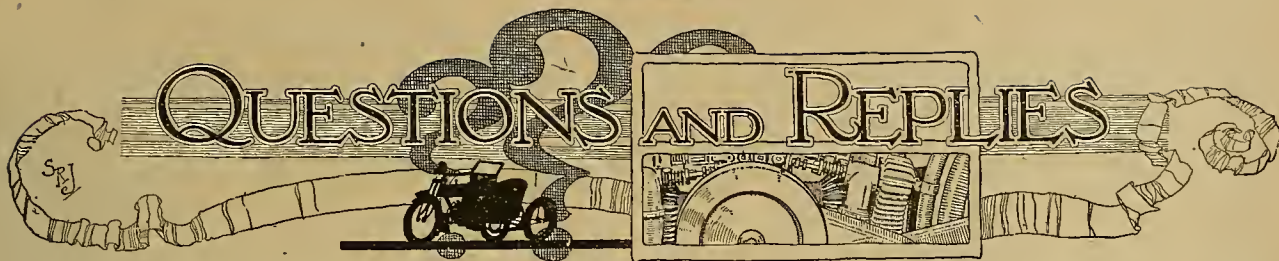
Is it fair that licences purchased in January, 1917, for using and riding a machine should lapse at the end of October? This is what the restrictions amount to. At the end of the year there will be no alternative to all motor cyclists but to keep the sum of 25s. in their pockets until the restrictions are removed.

I have not seen any record of the motor associations defending the poor motor cyclist who is invited to join as a paying member. In my opinion, *The Motor Cycle* is his best friend, and is the only reliable source for all information, and it still retains its columns as a free lance, admonishing the law-breaker, and defending the motorist when he is being unjustly treated. J.T.

Blackburn.



# QUESTIONS AND REPLIES



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

## The Use of Fuel.

**?** Please let me know if you consider that there is anything in the new Petrol Regulations to prevent my using what petrol I may have by me at the present time; also do the new regulations prohibit the use of petroleum oil?—T.H.

Since November 1st no liquid hydrocarbon (this includes paraffin) may be used as fuel for a motor vehicle unless the machine is used in one of the ways permitted by the new regulations.

## Local Taxation Licence Exemptions.

**?** I should be greatly obliged if you would let me know if I am exempt from paying the local taxation licence of £1 for my motor cycle. Up to this year I have paid it, but seeing I can use it only for business purposes I thought I should be exempt now, so will you please let me know what to do?—J.W.W.

The answer to your enquiry can be given only by your local licensing authorities. If the machine is a sidecar combination fitted with a box body, you might be exempted from paying the local taxation licence, as the machine could be used only for the conveyance of goods and merchandise. No exemption would be granted to a motor bicycle which is used for carrying the owner alone, even though only for business purposes. The Auto Cycle Union, 83, Pall Mall, London, S.W., will be interested to know if you have any difficulty with the licensing authorities.

## Overhead Valves.

**?** I have a 3½ h.p. water-cooled high-compression Precision engine with overhead valves. I find that when a valve breaks it drops into the cylinder and smashes the piston. (1.) Could you suggest a way of fastening a basket or something to catch the valve head before it touches the piston? (2.) Would you give me the correct valve timing for the same engine, as I do not get out of it the speed I should like?—S.S.

(1.) We fear that we can make no useful suggestion. If you fitted a wire, or anything, to prevent the valve falling through, it would get white hot and cause pre-ignition in a high compression engine. You can only rely upon getting first quality valves and trusting that they will not break. (2.) The valves should be timed in the following manner: Set the exhaust valve to close just after the

completion of the exhaust stroke. It will then commence to open when the piston is about one-seventh of the length of the stroke from the bottom of the firing stroke. The inlet should commence to open as the exhaust closes, and remain open for a little more than one complete stroke of the piston, or while the fly-wheels turn through 190°.

## Machines for Cripples.

**?** Do you know of any make of motor cycle (three wheels) suitable for a cripple who cannot use his feet at all?—W.D.

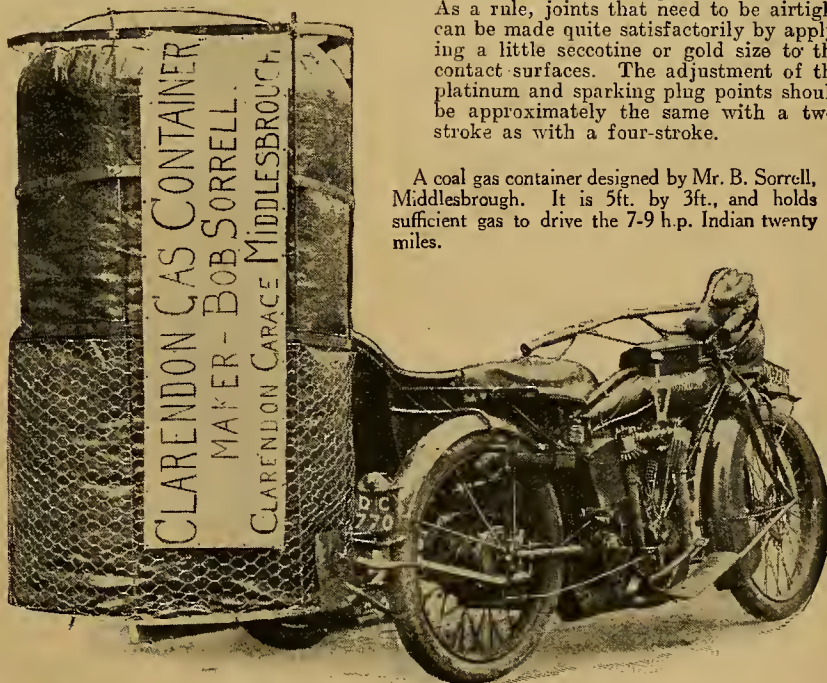
We are afraid we cannot give you any definite information on a motor cycle for a cripple who cannot use either foot, other than such as has been published from time to time in *The Motor Cycle*; also it is probable that other articles on this subject will appear in the near future. Our own suggestion is that the invalid should use a motor cycle and sidecar equipped with sidecar control and having a selective clutch gear with hand lever and hand starting. Such a machine would be the 6 h.p. Royal Enfield, Scott, or P. and M., which could easily be driven from the sidecar seat after quite minor alterations to the steering and braking controls.

## Overhauling a Two-stroke.

**?** I have just taken down a two-stroke Triumph. The top piston ring was badly gummed, and carbon deposit was formed on the cylinder walls. On reassembling I find there is a metallic click when the rings pass the ports, and also the engine refuses to take air. The bush (small end) is worn, and I am having a new bush and pin fitted, and also new rings. Should this prevent the clicking? Would air leaks be the cause of the engine refusing air? If so, what is the best means to secure an airtight joint when replacing cover over ports? I have tried paper soaked in oil, but this seems to get burnt away. Should the platinum points be adjusted on these machines as in a four-stroke?

Also the sparking plug points?—R.T.R.  
From the symptoms you describe we should imagine that the piston is too loose a fit in the cylinder. Consequently, although rebushing of the small end may mitigate the rattle, it will not entirely cure it, and the only satisfactory means will be to have a new piston fitted, which in turn may also necessitate reboring of the cylinder. Air leaks would certainly tend to lessen the supply of air that the engine will take through the carburetter. As a rule, joints that need to be airtight can be made quite satisfactorily by applying a little seccotine or gold size to the contact surfaces. The adjustment of the platinum and sparking plug points should be approximately the same with a two-stroke as with a four-stroke.

A coal gas container designed by Mr. B. Sorrell, Middlesbrough. It is 5ft. by 3ft., and holds sufficient gas to drive the 7-9 h.p. Indian twenty miles.





**Licence Endorsement.**

?

About four weeks ago I was fined 10s. because the rear light on my motor cycle had gone out. I am now requested to send my licence to be endorsed. Is this an offence which necessitates endorsement?—P.M.

Your licence may be endorsed for any offence under the Motor Car Act except for the first two convictions for exceeding the speed limit. If, however, you are a member of a motorists' association, you might do well to communicate with the secretary.

**Engine for a Cycle Car.**

?

I intend trying to build a four-wheel light car, buying the chassis complete, second-hand, but wish to employ a drive and gear, as is used in the G.W.K. (friction drive), as this is so simple and, I believe, very efficient, but the work must be done at the lowest possible cost. Would it be possible for me to use a 8 or 10 h.p. water-cooled motor cycle engine, such as the Henderson or Williamson? I take it that a small four-cylinder would run at much lower cost than the engines usually employed on light cars, but would it be as efficient?—E.S.B.

The Williamson motor cycle engine is not a four-cylinder, but a twin, and the Henderson is not water-cooled. Either of these engines would be quite satisfactory in a light cycle car frame. On the other hand, there is no doubt that an engine primarily designed for this class of work would give greater satisfaction.

**Ignition Trouble.**

?

I have bought an old Minerva motor cycle fitted with battery ignition, and I think the engine is all right. The compression is good and the petrol comes through satisfactorily. The engine is of 4½ h.p. I have a 4-volt dry battery, but cannot get a spark at the plug points. I can trace the current to the plug, and from the plug body to the other terminal, but there is no spark. I have tried two plugs—one a Sphinx three-point which is working on another machine, and a four-point which was on the Minerva. (1.) Is the 4-volt dry battery strong enough to ignite the petrol or is the plug at fault? (2.) Could I fix a magneto instead of the battery? (3.) Would one cable from the magneto to the plug be sufficient?—F.J.G.

(1.) The whole trouble may be due to your dry battery being partially run down. You had better try an accumulator or, (2) better still, a magneto. Magnetos are difficult to obtain, and are expensive, even second-hand, but, of course, if you can manage to get hold of one at a reasonable price, it would be well worth fitting. You would have to fix up a platform to carry the magneto, and fix a sprocket wheel on to the shaft of one of the timing pinions, driving the magneto by chain. (3.) Only two wires are needed on the magneto, one from the contact breaker to the handle-bar switch (which is not essential, as you can always stop by means of the exhaust lifter), and the other from the high-tension terminal on the magneto to the sparking plug.

**Engine will not Start.**

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I have a 1915 2½ h.p. Levis, and have just had it down for overhaul, and now I have it together I cannot get it to start.

I have examined the following: Compression, good; good spark at plug points; carburetter and jet all clear; piston right way in the cylinder; no air leaks at all. It will not fire pure petrol injected into the cylinder.—A.W. Probably you have connected up the magneto wrongly, and we should recommend you to check over the timing, which should be as follows: With the piston exactly on top of the stroke, connect up the magneto with the points just breaking and the ignition lever fully retarded. We presume you have not by any chance reversed the throttle and air slides in the carburetter.

**Repairer's Liability.**

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I should be very much obliged, if you could let me have legal advice on the following case. I have entered into a legal agreement, signed by me over a 6d. stamp and duly witnessed, with a London firm of motor cycle agents, whereby they agree to supply to me a 1916 — motor cycle for the sum of £30, to be paid by me in a deposit of £10 and six monthly payments of £3 7s. 6d., the machine to remain the property of the firm until the last instalment is paid. (I have paid the deposit of £10.) The machine arrives, and I at once have it examined by an expert (works foreman to a leading agent), who finds two large fractures in the crank case and the front forks badly twisted, as well as minor injuries. I point this out to the firm, they express surprise, and ask me for my suggestion as to having the matter settled. I reply that expert examination estimates £6 for necessary repairs to put the machine in good running order, but that as I was prepared to spend a few pounds myself upon the machine I would accept £3 for repairs. The firm reply that they cannot allow me £3 for repairs, and that they do not agree that a new crank case is necessary, but offer to weld the old one if I return it to them. (1.) Are the firm bound by the agreement to put the machine into "good running order" and a "thoroughly reliable condition," according to their advertisement and correspondence, and, if so, how can I compel them so to do? (2.) Can I insist upon a new crank case, as advised by the makers and supported by local expert advice? (3.) Can the firm demand back the machine, return my deposit, and refuse to supply another machine, thus cancelling the agreement without my consent? (4.) Can I refuse to pay instalments until the machine is put into good order, and what would be my position in that case if the firm take the matter into court?—K.S.

(1.) We do not think the firm are bound to put the machine into good running order, but, provided you can prove to the satisfaction of the court that it was not in good running order and was not a thoroughly good machine, you can either return the machine and demand

the repayment of the deposit, or can claim the reasonable cost of putting the machine right. As, however, the amount in dispute is small, we should think it would be better to compromise. However, you have the remedy in your own hands by deducting the amount in dispute from the instalments to be paid. (2.) Whether the motor cycle requires a new crank case to bring the machine up to the guarantee is purely a matter of fact in respect of which you must rely on local expert advice. (3.) No. (4.) Only to the extent of putting it right. We think the proper plan is for you to keep up the instalments and deduct the amount in dispute from the last instalment payable, but each time you pay an instalment you should mention that you intend to deduct the amount in dispute.

**Broken Rings.**

?

(1.) Please tell me how much space should be allowed at the ends of piston rings to allow for heat expansion. Is it possible to fit them too tightly? I fitted three new rings a few weeks ago, but since then the compression has disappeared. As I found the rings broken into bits, I thought they might have been too tight a fit. (2.) The gudgeon pin has worked slack and scraped the inside of the cylinder about half a millimetre in depth. Can I have this ground out without having to fit a new piston? Can the cylinder be sent off for repairs without the rest of the engine?—W.M.

(1.) The clearance at the ends of the piston rings should be one-sixty-fourth of an inch. Evidently the rings were too tight, and the formation of carbon caused them to snap. (2.) The scratch can be ground out, but you will have to have a new piston fitted. You need send only the cylinder and piston.

**RECOMMENDED ROUTES.**

**NOTTINGHAM TO COVENTRY.**—W.G.R.  
Nottingham, Long Eaton, Brendon, Cole Orton, Ibstock, Hinckley, Shilton, Coventry.

**LIVERPOOL TO STOCKTON.**—A.C.B.  
Liverpool, Ormskirk, Preston, Whalley, Clitheroe, Gisburn, Skipton, Blubberhouses, Ripley, Ripon, Thirsk, Tontine Inn, Yarm, Stockton.

**BEDFORD TO HAY.**—R.T.G.  
Bedford, Newport Pagnell, Stony Stratford, Buckingham, Aynho, Deddington, Chipping Norton, Stow-on-the-Wold, Andoversford, Cheltenham, Gloucester, Ross, Hereford, Willersley, Hay.

**CHICHESTER TO BANBURY.**—W.R.B.  
Chichester, Havant, Fareham, Bishop's Waltham, Winchester, Whitchurch, Newbury, East Ilsley, Abingdon, Oxford, Deddington, Banbury. The distance is approximately 100 miles.

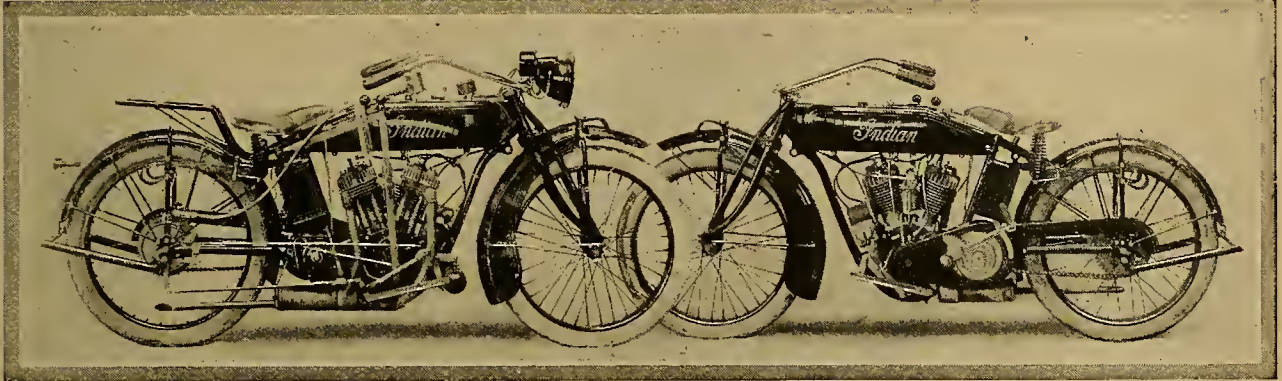
**FARNBOROUGH TO WELLINGTON (SALOP).**—CPL. B.  
Farnborough, Blackwater, Eversley, Reading, Pangbourne, Stratley, Wantage, Faringdon, Burford, Stow-on-the-Wold, Broadway, Evesham, Worcester, Kidderminster, Bridgnorth, Wellington.



1918  
Powerplus

# Indian

Motocycles



Which we trust will be Post-War Models.

We regret that we are not in a position to supply motorcycles or send out catalogues at the present time, but when we are able to do so we will freely advertise the fact. This applies to Great Britain only.



**HENDEE MANUFACTURING CO.,**

"Indian House," 366-368, Euston Road, London, N.W.

Telephone: Museum 1643.

Telegrams: "Hendian, Eusroad, London."

AUSTRALIA, 109-113, Russell St., Melbourne.

CANADIAN WORKS, 12-14, Mercer St., Toronto.

AFRICA, Indian House, 127-9, Commissioner Street, Johannesburg.

Indian House, 579, West Street, Durban.

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BEING engaged solely on work of NATIONAL IMPORTANCE, we are still unable to supply Motor Cycles.

May we, however, record your address to mail you copy of the new catalogue we expect to issue as soon as hostilities cease?

Our post-war programme provides a new Combination Twin Model with spring



frame, the practical experience gained on Colonial roads during our recent trip Round the World having enabled us to design the most suitable Combination Model for Colonial and Home requirements.

The Lloyd Motor Engineering Co., Ltd.,  
132, Monument Road, Birmingham.

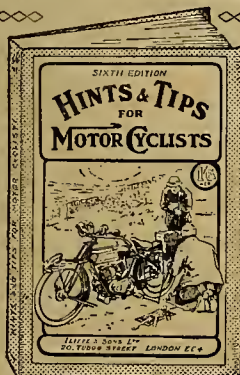
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## MOTOR CYCLES FOR SALE.

### A.J.S.

**A.J.S.**, new Military Model, 1917; £90/6.—Turpins, 29, Preston Rd., Brighton. [2035]

**A.J.S.** Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [9688]

**A.J.S.**, 2½h.p., 2-speed gear, 1916, as new, ridden only 400 miles.—Mearley, Ironmarket, Newcastle. [X0091]

**A.J.S.**, 2-speed, clutch, and K.S., all-chain drive, £37/15; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [2395]

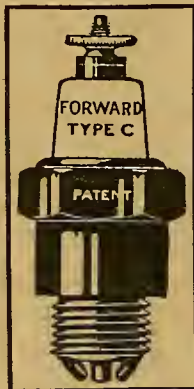
**A.J.S.**, 6h.p., and sidecar, one of the last 1915 models turned out; price only 75 gns.—Julians, 84, Broad St., Reading. 'Phone: 1024. [X931]

**1916** 6h.p. A.J.S. Combination, speedometer, spare wheel, lamps, etc., perfect, run 1,600 miles; £30.—Cook, 120, Park Rd. North, Birkenhead. [2322]

**A.J.S. Motor Cycles.**—Immediate delivery of the very latest 6h.p. models from stock.—The A.J.S. Specialists, The Walsall Garage, Walsall. Tel.: 444. [X9372]

**A.J.S.**, 2½h.p., 2-speed, K.S., excellent condition, tyres and chains perfect, lamps, horn, tools; £33; exchanges entertained; push bike part.—Cpl. Tavinier, A.M.T.S., Bluntpore, Tidworth. [2337]

**A.J.S. Motor Cycles.**—Immediate delivery of special 1917 model, complete, detachable wheels, 700×80 tyres; £91/6.—P. J. Evans, 87-91, John Bright St. Sole agent for Birmingham and district. [2352]



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to help or to hinder.

You may have experienced the one that hinders (most people have), but — have you knowledge of the one that helps — to wit the

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If you have, plugs to you are "out of sight and mind," but if you haven't — take the first step to acquire that knowledge and the service of the plug that will "help" all the time, and — Write for details now.

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Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the production of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

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## MOTOR CYCLES FOR SALE.

### A.J.S.

**A.J.S.**, 4h.p., twin-cyl., with sidecar, complete, late 1916 model, machine has hardly been used, and is in condition equal to new, complete with spare wheel with tyre, lamps, spare valves, chains, etc., all new.—Apply, Watford, 110, Hills Rd., Cambridge. [X9952]

### Alldays.

**ALLON**, 2-speed, £29/10; also all new models; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [2397]

**ALLDAYS** Allon, 1916, 2 speeds, indistinguishable from new; £23.—Percy and Co., 337, Euston Rd., London. [2360]

**ALLDAYS**, 2½h.p., 2-stroke, 3 speeds, clutch, good tyres, condition, and appearance; £22.—Frank, 60, Sussex Rd., Southport. [2326]

**ALLON**, 2-speed, condition like new, lamps, tools, horn, spares; £28; exchanges entertained, ladies' and gents' push cycles part.—Cpl. Tavinier, A.M.T.S., Bluntpore, Tidworth. [2338]

**ALLDAYS** Allon, 2-speed, 2-stroke, July (1915), re-bushed main and big end small ends, rings, etc., by makers this year, and not used at all since, Palmer cord back, Hutchinson front, condition perfect, all accessories; £25, no offers.—Howard, Royal Defence Corps, Rutlish. [2349]

### Ariel.

**CROW** Bros., Guildford.—Ariel, latest 3½h.p., 3-speed countershaft models in stock. [1048]

**ARIEL**, 5-6h.p., 3-speed and clutch, O.B. sidecar, hood, screen, Lucas lamps, Covey speedometer; £66; E.P. or exchange; all new models supplied.—Service Co., 292, High Holborn, W.C.1. [2392]

### Auto-Wheels.

**GENUINE** Wall Auto-Wheel, little used, new condition, complete; £8/10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X9953]

### Bat.

**BAT-J.A.P.**, 6h.p. Brooklands Model, 3-speed, fast and powerful, Bramble sidecar, Smith's speedometer, perfect order and condition, all accessories; £35, no offer.—St. Margaret's, Solway Rd., E. Dulwich, S.E. [2318]

### Bradbury.

**BRADBURY**, 1912, 4h.p., 2-speed, kick; £16.—Box 1,522, c/o The Motor Cycle. [X9955]

**BRADBURY** 4h.p., 3-speed; £25; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [2408]

### Brown.

**3½**h.p. Brown, magneto, low built, good tyres, engine lately overhauled, splendid order throughout; £12/10.—Box LS,280, c/o The Motor Cycle. [2332]

### B.S.A.

**B.S.A.** Combination, 1916, in real nice condition; £55.—Percy and Co., 337, Euston Rd., London. [2368]

**B.S.A.** Combination, 1914, 4½h.p., chain drive, clutch, countershaft, good condition; £55.—Hyde, 54, Bingham Rd., Bournemouth. [X9988]

**WILL** Accept for immediate sale £40.—B.S.A., 1914, countershaft, chain-cum-belt, coach sidecar, tyres good, Dunlop new combination back, enamel as new, mechanical condition perfect, recently overhauled, very economical.—Bedbrook, Tredegars, 9a, Diana Place, Euston Rd., N.W.1. [X0096]



## MOTOR CYCLES FOR SALE.

## B.S.A.

1916 B.S.A., 4½ h.p., all-chain drive countershaft 3-speed, Canoelet coachbuilt sidecar, complete with lamps, Klaxon horn, etc., spare tyre, perfect condition; £60.—Lieut. Hemingway, Hylton Castle, Sunderland. [X0129]

4½ h.p. B.S.A. Combination, chain-cum-belt, No. 2 sidecar, Lucas lamps, horn, Cowey speedometer, unsratched, and absolutely as new; £75.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551]

## Calcott

CALCOTT, 1914, fixed gear, good condition; £18.—Bonit, Chesterfield. [X9984]

## Calthorpe.

CALTHORPE-J.A.P., 1915, Enfield 2 speeds, in real nice condition; £20.—Percy and Co., 337, Euston Rd., London. [2361]

## Campion.

CAMPION, 8 h.p. twin J.A.P. engine, 3-speed countershaft, clutch, kick start, chain drive, Bosch enclosed, lamps, horn, and speedometer, also Gloria 25 g.p. coach sidecar, spring wheel, combination bought new March, 1914, tyres and general condition perfect; any trial; £40, or near offer.—Bristowe, Old Somerby, near Grantham, Lincs. [2341]

## Clyno.

CLYNO 1913-14 Combination, 5-6 h.p., 3-speed, spare wheel, lamp, seat, Cowey speedometer, horn, etc., price £59/10; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [2405]

## Douglas.

DOUGLAS, late 1915, 2-speed, overhauled; bargain, £28.—47, Hamilton Rd., Reading. [2300]

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749]

DOUGLAS, 2½ h.p., 2-speed, equal new; £27/10.—Flying Officer, 100, High Rd., New Southgate. [X9958]

DOUGLAS, 1914, 2-speed, magnificent condition; 30 gns.—Julians, 84, Broad St., Reading. Phone: 1024. [0927]

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855]

1913 Douglas, 2½ h.p., 2-speed, thoroughly overhauled, speedometer, accessories, sound, genuine; £29/10.—Campbell, Draper, Buntingford. [X9945]

DOUGLAS, 2½ h.p., 1911, single gear, in good running order, tyres and belt good; £16, or close offer.—Davies, The Grove, Menai Bridge. [X9949]

DOUGLAS, 1913, 2-speed, Bosch mag., £32/10; E.P. or 2½ h.p., with lamp and tools, £12/10; or E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [2389]

DOUGLAS Motor Cycles.—We can deliver 1917 Model W on receipt of permit.—E.H. Clark, the Bristol Douglas agent, 225, Cheltenham Rd., Bristol. (Wholesale and retail.) [0923]

DOUGLAS, 1912, £19/10; 1913, £31/10; 1915, £45; prompt delivery of new 1917 models to doctors, farmers, etc., against Ministry of Munitions permit.—Motor Exchange, Hoiou St., Halifax. [2261]

DOUGLAS, 2½ h.p., 1914 T.T., 2 speeds, Bosch, Amac carburettor, Dunlop tyres, new condition, complete lamps, mechanical horn, engine just overhauled, a nice machine; 29 gns.—Motorist, 49, Wokingham Av., Shoeburyness. [2347]

4 h.p. Douglas, 1915-16, 3-speed, kick start, hand clutch, semi T.T. bars, Dunlop tyres, mechanical horn, electric lighting set, in splendid condition; £55, or near offer; sidecar for same required extra.—Lt. Ferun, Heathside, North End, Hampstead, N.W. [2328]

1917 2½ h.p. Douglas, Model W, hand-controlled clutch, kick start, latest improvements, £54, plus 20%; also Models U and V, 1916 specification, £50, plus 10%; absolutely new; immediate delivery against priority permits for doctors, farmers, war and munition workers.—How and where to apply for full particulars, write the Douglas Specialists, Robinson's Garage, Green St., Cambridge. [2279]

## Enfield.

ENFIELD, 3 h.p. twin, 1916 model; practically equal to new; 39 gns.—Julians, 84, Broad St., Reading. Phone: 1024. [0928]

ENFIELD, late 1915, 3 h.p. twin, and lightweight O.B. sidecar; £45; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [2396]

ROYAL Enfield 1916 Combination, 6 h.p., Palmer cord, perfect condition, bought for pleasure only; £85; will give warranty.—Chambers, 1, York Rd., Canterbury. [2297]

ENFIELD Combination, 1913, 6 h.p., complete, ready and in good order for road, Binks carburettor, 3 lamps, D.A. wind screen, special mudguard.—Hartley, Wendover, Monton Rd., Eccles. [X0128]

1917 Enfield, 3 h.p., 2-speed, fitted with light sporting Canoelet sidecar, heap accessories, ridden 700 miles, like new; also three electric 6 h.p. combinations, from £100; and three standard combinations, from £65.—Lamb's, 151, High St., Walthamstow, and 30, High Rd., Wood Green, N. [2285]

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1917 ROVER, T.T., Philipson .. 55 Gns

1917 NEW IMPERIAL-J.A.P. .. 40 Gns

1917 NEW IMPERIAL-J.A.P., kick-starter ..... 47 Gns

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1917 LEVIS Popular, 2-stroke .. £32 0

1917 LEVIS, 2½ h.p., 2-speed .. £47 10

1917 LEVIS, 2½ h.p., single-speed 35 Gns

1917 ENFIELD, 3 h.p., 2-speed .. 55 Gns

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1914 DOUGLAS, 2½ h.p., 2-speed 30 Gns

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Biggest Light Car and Motor  
Cycle Dealers in the South.

46 years' reputation.

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## MOTOR CYCLES FOR SALE.

## Excelsior.

AMERICAN Excelsior, new February, 1917, 7 h.p. twin, 3-speed, chain drive, kick starter, Montgomery spring frame sidecar, 3 lamps, horn, guaranteed in perfect condition; £70.—The Premier Motor Co., Aston Rd., Birmingham. [2375]

AMERICAN Excelsior, new Model de Luxe, 7 h.p., 3-speed, dynamo electric lighting outfit, head lamp with 2 bulbs, tail lamp and electric horn, £85; special coachbuilt sidecar, enamelled to match, luxuriously upholstered, wind screen, 28x30 in. tyre, etc., £20; liberal exchanges, immediate delivery.—The Premier Motor Co., Aston Rd., Birmingham. [2376]

## Harris.

HARRIS-PEUGEOT, 3½ h.p., 1913, clutch, single, Bosch, B. and B., good appearance and condition; London district; £17.—Box 1,524, c/o The Motor Cycle. [X9937]

## Harley-Davidson.

1916 Harley-Davidson Combination, electric model, good condition; £85.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552]

HARLEY-DAVIDSON 1914 Combination, Mills-Fulford sidecar, perfect condition; £50.—Willavise, 707, Finchley Rd., Child's Hill, N.W. [2317]

J. A. STACEY, 12, Ecclesall Rd., Sheffield, has several H.D. combinations in stock, from 50 gns., all in perfect order; H.D.'s overhauled from 25/-; new parts extra; ask for quotation. [1687]

HARLEY-DAVIDSON, 1917, electrically equipped khaki model, with Harley coachbuilt sidecar, all accessories, tyres in good condition; £115.—A. S. Butler, Wyck Hill, Stow-on-the-Wold, Glos. [X0127]

1916 Harley-Davidson Combination, lighting set, smart turnout, ready for the road; any severe trial allowed; looks like new; £77/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [2374]

HARLEY-DAVIDSON Combination, 1915, electrically equipped, aluminium disc wheels all round, hood and screen, etc.; £75; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [2402]

1917 Model Harley-Davidson, P. and H. lamp, Smith speedometer, only run 550 miles, splendid condition, £125; Swan sporting sidecar; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [2403]

HARLEY-DAVIDSON 1917 Electric Combination, H.D. sidecar, ridden approximately 300 miles, quite as new, £135; also three 1915 models, from £65; and one 1916 model, £84.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [2284]

## Hazlewood.

HAZLEWOOD 5-6 h.p. Combination, J.A.P. engine, 3-speed, clutch, and K.S., lamps, speedometer, special sidecar; £65; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [2391]

## Henderson.

HENDERSON, 10 h.p., 4-cyl., Millford Empress sidecar, mileage 6,000, newly repaired, condition guaranteed perfect, horn, and lamps; £70.—Capt. Mortimer, R.A.M.C., Gore Court, Sittingbourne. [X9889]

## Humber.

HUMBER, 3½ h.p., single speed, £11/10; 3½ h.p., 2-speed, £19/10.—Motor Exchange, Horton St., Halifax. [2262]

HUMBER, 3½ h.p., 2 speeds, in real good condition throughout; £10/10.—Percy and Co., 337, Euston Rd., London. [2366]

1914 Humber, with 14 gns. sidecar, 3½ h.p., 3 speeds, kick starter, Bosch, Watford speedometer, all accessories, tyres nearly new; trial by appointment; £42.—79, Southampton St., London, N.1. [2312]

## Indian.

INDIAN 1916 Powerplus 7-9 h.p. 3-speed Combination, no lamps, only run 300 miles, paint and plate quite new; will take £85 cash.—Farr, 15, St. Pancras, Chichester. [2315]

5 h.p. Indian Combination, late 1915, coachbuilt sidecar, Lucas lamps and horn, excellent condition, only done 3,000 miles; £55.—Roper, Morton, Rowsley Av., Hendon, N.W. [2316]

INDIAN, late 1915, 7-9 h.p., and Indian coachbuilt sidecar, 3-speed, spring frame, kick starter, speedometer, accumulator lighting set, with head, side, and rear lamps, and electric horn, only run 4,000 miles, perfect throughout; £55 cash.—Farr, 15, St. Pancras, Chichester. [2314]

## James.

JAMES 1916 Combination, Lucas dynamo lighting, Stewart speedometer, price £78; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [2407]

DON'T Miss This.—Late 1912 4½ h.p. single speed James, very fast and powerful, guarantee in perfect mechanical condition, only wants cleaning; first £18 received secures this wonderful bargain.—Brown, 11, Higher Albert St., Chesterfield. [X9947]



## MOTOR CYCLES FOR SALE.

## James.

JAMES, all models, new and second-hand; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [2404]

## Levis.

LEVIS Popular, 1916, lamp and horn; £25.—Box L5, 279, c/o The Motor Cycle. [2331]

LEVIS Lightweight, in real nice order and condition; £18.—Percy and Co., 337, Euston Rd., London. [2369]

## Matchless.

MATCHLESS 8hp. Combination, new, fitted with J.A.P. or M.A.G. engines; extended payments or exchanges.—Service Co., 292, High Holborn, London, W.C.1. [2406]

1914 Matchless Canoelet Combination, 8hp. J.A.P., 2 speeds, Binks, Bosch, wind screen, luggage grid, Lucas lamps, horn, spare tubes, tools; £45, lowest.—Pierce, 27, Dumbarton Rd., Clydebank. [2305]

## Minerva.

2 1/2hp. Minerva, Bosch mag., B. and B. carburettor, 24 tyres as new; first £7/10 secure.—Lees, Chesterfield Rd., Staveley. [X9990]

## Motosacoche.

MOTOSACOCHE, 1913, 2 1/2hp., variable gear, perfect condition; bargain, £12.—163, St. Alban's Av., Bedford Park, Chiswick. [2299]

## New Hudson.

NEW Hudson, 3 1/2hp., 3-speed, clutch, Bosch mag.; £35/10; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [2386]

NEW Hudson 1914 Coachbuilt Combination, 3-speed, clutch, kick starter, new tyres and tubes, mechanical horn, lamps, and accessories; £35.—Fugh, c/o Standard Aircraft, Bow Common Lane, E. [X0095]

## New Imperial.

NEW Imperial, 2 1/2hp., 2-speed, 1915, excellent condition; cash £23—47, Hamilton Rd., Reading. [2301]

CROW Bros., Guildford.—New Imperial, latest 2 1/2hp., 3 1/2hp., 6hp. models in stock; also sound second-hand. [1047]

NEW Imperial-Jap, 1916, 2 1/2hp., 2 speeds, lamps, perfect condition; £25, or near offer.—Parradine, White St., Dunmow. [2340]

1917 New Imperial-Jap, absolutely equal to new; 32 gas.—Julians, 84, Broad St., Reading. 'Phone 1024. Closed Wednesdays 1 o'clock. [0932]

IMPERIAL-J.A.P., 2-speed, clutch model, £32/10; also new models in stock; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [2387]

2 1/2hp. New Imperial-Jap, 1915, engine No. 7,845, 2-speed, footboards, perfect, tyres good, easy starting, low consumption; any trial; test offer above £20.—Lieut. Sapcote, R.E., Neame House, Herve Bay, Kent. [2325]

1917 (August) 6hp. New Imperial-Jap and Montgomery sidecar, complete with F.R.S. lighting set, mechanical horn, spare tank, Collega mudshield, all in tip-top condition; £85.—J. O. Phipp, Sherston, Malmesbury, Wilts. [2324]

NEW Imperial 8hp. J.A.P. Overseas War Office Combinations, as described in detail pages 292-3, Sep. 13th issue of this paper, exceptional machine in every detail; immediate delivery from stock; £114/9.—Colmore Depot, Distributors, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886]

## Norton.

NORTON.—Big 4 Military Model, all-chain; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [2393]

NORTON.—Immediate delivery of latest big 4 Military or Colonial models; £82.—Parker's, Bradshawgate, Bolton. [X9966]

NORTON Military Model, brand new, actually in stock for immediate delivery.—Percy and Co., 337, Euston Rd., London. [2365]

## N.S.U.

N.S.U., 3 1/2hp., 2 speeds, coachbuilt sidecar, in perfect order throughout; £14.—337, Euston Rd., London. [2353]

N.S.U., 3 1/2hp., 2-speed, new 1917 coach sidecar; £24/10.—Motor Exchange, Horton St., Halifax. [2263]

HAVING Acquired the Entire Stock-in-trade of the N.S.U. Motor Co., Ltd., we can now supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Eagles and Co. Acton Hill Works, Acton, W.3. [X9943]

## N.U.T.

N.U.T. and sidecar, 1914, 4-speed, clutch, and kick start; £55.—Boulton, Chesterfield. [X9982]

6-8hp. N.U.T.-J.A.P. and sidecar, late 1914, 3 speeds, and clutch, lamps, tools, horn, spare belt, etc., new special Dunlop tyres, Binks carburettor; £45.—Can be seen Heathlands, Chadwell Heath. [2343]

## O.K.

O.K. Juniors.—Call and inspect at the N.W. district agent, F. J. Youngs, 2-3, The Parade, Kilburn. [0910]

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1917 MATCHLESS Combination, 8B, M.A.G. engine, spare wheel and tyre; as new, only ridden 3 times ..... £120

1916 HARLEY - DAVIDSON Combination, 7-9 h.p., electric model ..... £85

1916 SUNBEAM Combination, 8 h.p., Lucas lighting set, speedometer, horn, mud-shields, screen, spare petrol tank, interchangeable wheels, splendid condition ..... £115

1916 Powerplus INDIAN Combination, spring frame, dynamo lighting, T.T. bars, unscratched ..... £85

1915 INDIAN, 5 h.p., and Swan torpedo Sidecar, lamps, horn, speedometer, finished throughout yellow ..... £45

1914 MATCHLESS Combination, 8 h.p. M.A.G., lamps, horn, speedometer, luggage grid, just been thoroughly overhauled ..... £68

1916 B.S.A., 4 1/2 h.p., chain-cum-belt, and Millford Sidecar, lamps, horn, etc. .... £65

1915 HAZLEWOOD Combination, 5-6 h.p., J.A.P. engine, 3-speed, clutch and kick start, lamps, and horn; good condition £40  
Any of the above can be converted to run on coal gas.

## SOLO MACHINES.

1917 ZENITH Gradua, 4-5 h.p., clutch, kick-start, as new, only ridden a few miles .. £73

1917 ROVER, 3 1/2 h.p., T.T., Phillips pulley, lamps, horn, as new ..... £50

1917 NEW IMPERIAL-J.A.P., 2 1/2 h.p., 2-speed, clutch, kick-start, T.T. bars, as new, bargain ..... £30

15-16, Bishopsgate Avenue, Camomile Street, E.C.3.

'Grams: "Elecmocyca, London."  
Phone: Avenue 5548.

## MOTOR CYCLES FOR SALE.

## Premier.

PREMIER, 1914 1/2, 3-speed, clutch, and kick start; £32.—Boulton, Chesterfield. [X9983]

PREMIER Combination, 3-speed countershaft, kick accessories; bargain, £30.—Newell, Laurels, East Malling, Maidstone. [2319]

PREMIER, 1914, 3 1/2hp., 3-speed, clutch, and K.S. Stewart speedometer, lamp, and horn, £34/15; 1916 combination, £66; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [2398]

## Radco.

RADCO, 1917, 2 1/2hp., 2-stroke, as new; £25; extended payments or exchange.—Service Co., 292, High Holborn, London, W.C.1. [2401]

## Rex.

REX, 6hp., mag., and cane sidecar; bargain, £15/10. 3 1/2hp. mag. Rex, £9/15.—Motor Exchange, Horton St., Halifax. [2264]

## Rover.

ROVER.—All new models supplied; E.P. or exchange.—Service Co., 292, High Holborn, London. [2364]

ROVER T.T., equal to new; 55 gas.; 1917 model.—Julians, 84, Broad St., Reading. 'Phone: 1024. [0929]

ROVER, 3 1/2hp., late 1916, 3-speed countershaft, kick starter, head lamp, generator, rear lamp, very nice mount, perfect throughout; £55.—Mebes and Mebes, 154-6, Gt. Portland St., London, W.1. [2356]

1913, 3 1/2hp. Rover, B. and B., waterproof Bosch, Grado gear, pan saddle, very good tyres, good condition, footboards fitted, very economical; £25, or near offer.—Tinimus, Sharlston, Wakefield, Yorks. [X0130]

1916 Rover, with T.T. bars, 3 1/2hp., 3-speed, clutch and kick start, purchased new June, 1917, very little used, and really indistinguishable from new; owner gone Overseas; 57 gas., very big bargain.—Julian, 84, Broad St., Reading. 'Phone: 1024. Biggest light car and motor cycle dealer in the South. Closed Wednesdays 1 o'clock. [0934]

## Royal Ruby.

ROYAL Ruby.—All new models supplied; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [2384]

COUNTERSHAFT 1917 (July) Royal Ruby, 4hp. J.A.P. Starnley-Archer 3-speed, done under 150 miles, speedometer, and lamps, mechanical horn, knegrips, unscratched; cost over £80, accept £65, or with brand new Phoenix torpedo sidecar £75.—Bennett, 95, Wellmeadow Rd., Catford. [X9966]

## Rudge.

RUDGE Multi, 5-6hp., coachbuilt sidecar, very smart; £45.—Motor Exchange, Horton St., Halifax. [2265]

RUDGE, I.O.M., special fast machine, almost new; £45.—Percy and Co., 337, Euston Rd., London. [2364]

RUDGE, T.T. Multi, £29/10; 1914, fitted for substitute, £33; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [2385]

RUDGE Multi, 3 1/2hp., practically new 1916 engine, fully equipped, good tyres, in good condition throughout; £31.—Carpenter, 52, North Bar, Banbury. [X9940]

RUDGE Multi and sidecar, coachbuilt, 3 1/2hp., 1914, Dunlop tyres, new condition, Senspray carburettor, lamps, horn, very smart combination, been very carefully used; price 36 gas., bargain.—12, Clifton Rd., Southend-on-Sea. [2345]

3 1/2hp. Rudge Multi, late 1913, hand clutch, T.T. 2 bars, electric lighting, bicycle and engine thoroughly overhauled, splendid mechanical order, 47 m.p.h., and 92 m.p.g.; £35.—Sutton, Warraat Officer, R.N., 105, Lincoln Rd., Peterborough. [X9939]

## Scott.

SCOTT, 1913, Bosch mag.; £37/10; 2-speed, clutch, and kick starter; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [2388]

## Spur.

SPUR, 2 1/2hp., 2-speed, 2-stroke, E.I.C. mag. (Levis type engine), very smart machine, lamps, horn, tools; a great bargain, price £15/15.—12, Clifton Rd., Southend-on-Sea. [2346]

## Sunbeam

SUNBEAM Combination, 1917, 3 1/2hp. Military Model, almost new; £100.

SUNBEAM Combination, 1917, 6hp. M.A.G., almost new; £105.—Percy and Co., 337, Euston Rd., London. [2367]

1916 8hp. Sunbeam Combination, fully equipped; £115.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492]

SUNBEAM Combination, 3 1/2hp., 1915, in excellent condition, wind screen, complete outfit; £80.—Hubert, 198, Colman St., Hull. [X9953]

SUNBEAM, 3 1/2hp., 1917, countershaft W.D. Model; can be seen at any time; £65, no offers.—Lt. Whor-ton, 10, Silverdale, Sydenham, S.E. [2348]

SUNBEAM Combination, 1914 model, having Sunbeams' own coachbuilt sidecar, 3 1/2hp., 3-speeds, kick starter, in splendid running order; price for quick sale £45; originally cost £95.—Apply, 20, Hallville Rd., Liverpool. [2351]



## MOTOR CYCLES FOR SALE.

## Swift.

**SWIFT** and C.B. Sidecar, 1915-16, 3 1/2 h.p., clutch, and K.S., complete with lamp and horn, splendid condition; £49/10; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [2392]

## T.D.C.

**DE LUXE T.D.C.**, 1916, 2 1/2 h.p., spring forks, lamp, as new; £20.—Gregory, 157, Leander Rd., S.W.2. [2350]

**WAR Bargain**—Late 1914 2 1/2 h.p. 2-stroke T.D.C. de Luxe, T.T. bars, owner abroad; first cheque £12 secures to effect quick sale.—Millard, Sydenham Rd., Guildford. [X9937]

## Triumph.

**TRIUMPH J.A.P.**, 3 1/4 h.p., footboards; £19; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [2400]

**TRIUMPH**, 3 1/2 h.p., 1910, £17/17; 1911, with Phillips pulley, £19/19; 3 1/2 h.p., 2 speeds, 19 gns.—Motor Exchange, Horton St., Halifax. [2266]

**TRIUMPH**, 3 1/2 h.p., £17/10; 1912-3. Bosch mag., S.A. free-wheel clutch, £26/10; E.P. or exchange.—The Service Co., 292, High Holborn, W.C.1. [2399]

**1911 Standard Triumph**, 3 1/2 h.p., plating as new, tyres excellent, rear tyre new, all accessories; 16 gns., bargain.—H.D., Florida, Mayfield Rd., East Cowes. [2302]

**1914 Triumph**, 4 h.p., 3-speed, free engine, Stewart speedometer, P. and H. lamps, Canoelet coach sidecar, in perfect order; £50.—Hardwicke Arms, Arrington, Royston, Herts. [X0093]

**1913 3 1/2 h.p. 3-speed Triumph**, C.B. sidecar, 3 lamps, 2 horns, speedometer, just overhauled; bargain, £38, no offers.—Yonge, c/o Page's Garage, 162, Ace Lane, Brixton, S.W. [2329]

**1911-12 Triumph**, 3 1/2 h.p., free engine, Watsonian sidecar, overhauled November, new piston, etc., all accessories, fast, powerful, £30; without sidecar £27.—Campbell, Buntingford. [X9946]

**TRIUMPH Junior**, 2 1/2 h.p., 2-speed, maker's specification 2 Lucas lamps, horn, tools, pump, under 100 miles, soiled only, really brand new, perfect condition.—Robinson's Garage, Green St., Cambridge. [2280]

**1914 4 b.p. Triumph**, dropped top tube, decompressor, Starnay-Archer Mark J.S. 3-speed, clutch, new front tyre, complete with P.M.O. special coachbuilt sidecar, 4-point attachment; this combination has not done 3,000 miles, and is guaranteed mechanically perfect; £45.—The Premier Motor Co., Aston Rd., Birmingham. [2377]

## Zenith.

**ZENITH 1914 6 h.p. Coachbuilt Combination**, speedometer, horn, lamps, in good condition; £45.—King, 65, Battersea Bridge Rd., S.W. [X0117]

**ZENITH, 1914, 4 h.p., single-cyl.**, J.A.P. engine, Bosch mag., B. and B. carburettor, Gradua gear, good tyres, tools, spares; £20.—Mac, 57, Pagoda Av., Richmond, Surrey. [2339]

**ZENITH, 4 h.p., 1914, T.T. bars, tyres and belt new**, lamps, mechanical horn, perfect condition; £25, or exchange with cash for 5-h.p. Bat. A.J.S. or Zenith.—Lt. Beck, R.F.O., Faversham, Kent. [2353]

**ZENITH, 8 h.p., late 1915, countershaft model**, fitted with coachbuilt sidecar, hood and screen, F.R.S. lamp, Lucas horn, Cowey speedometer, and many other spares and accessories, condition perfect; cost £115, take best offer over £65.—Phone: Cox, Park 1116, or write 216a, Fulham Palace Rd., Fulham, for interview. [2308]

## Miscellaneous.

**BOOTH'S Motorcycles**, Portland Place, Halifax.—Detailed list of motor cycle bargains free. [X0117]

**HARLEY-DAVIDSON**, 7-9 h.p., fitted with grey coachbuilt sidecar; £69/10.—Booth's Motorcycles. [X0117]

**TRIUMPH**, 1910, free engine, T.T. bars, good tyres; £18/10.—Booth's Motorcycles, Halifax. [X0117]

**BRADBURY**, 4 h.p., 1911, Grado gear, coach sidecar, with screen; £25/15.—Booth's Motorcycles. [X0117]

**TRIUMPH**, 1911, free engine model, in nice condition; £21/15.—Booth's Motorcycles, Halifax. [X0117]

**REX**, 6 h.p., 1909, mag., spring forks, good tyres; £13/15.—Booth's Motorcycles, Halifax. [X0117]

**SINGER**, 3 1/2 h.p., 1913, 3 speeds, £12/12 coach sidecar; £31/10.—Booth's Motorcycles, Halifax. [X0117]

**PREMIER**, 3 1/2 h.p., 1911, 3-speed gear, Bosch mag.; £21/10.—Booth's Motorcycles, Halifax. [X0117]

**RUDGE Multi** 3 1/2 h.p., 1914, T.T. model, enamelled red; £29/15.—Booth's Motorcycles, Halifax. [X0117]

**SPECIAL Bargain**—3 1/2 h.p. Triumph, 1910, free engine model; £16/10.—Booth's Motorcycles, Halifax. [X0117]

**ZENITH**, 5 h.p., 1913, Zenith gear, nice coach sidecar; £42/15.—Booth's Motorcycles, Halifax. [X0117]

**CALTHORPE J.A.P.**, 2 1/2 h.p., 1915, Enfield 2-speed, £25/15; 3 h.p. Minerva, mag., £8/15.—Booth's Motorcycles, Halifax. [X0117]

**2 1/2 h.p. 1914 T.D.C.**, £14/15; 1916 T.D.C., £17/10; 2 1/2 h.p. 1914 Sun-Villiers, £16/15.—Booth's Motorcycles. [X0117]

**B.S.A.**, 4 1/2 h.p., 1914, with sidecar, £45/5; Scott, 1912, and sidecar, £29/15; Rudge, 1912, Grado gear, £19/15; Rudge, 1913, Multi gear, £25/15; 3 1/2 h.p. Excelsior, £4/19.—Booth's Motorcycles, Halifax. [X0117]

**1913 6 h.p. Rudge Multi** and Montgomery sidecar; £36/15; 7-9 h.p. Harley-Davidson, 1914, 2-speed, £42/10.—Booth's Motorcycles, Halifax. [2076]

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## TRICARS FOR SALE.

**H.S.M. Motor Sociable Tri-car**, wheel steering, chain drive, hood, screen, J.A.P. engine, 8-10 h.p., 1914 make, very little used, perfect condition; photo, full particulars; offers required.—Benyon, Rockland, Bromyard. [X9959]

## SIDECAR ATTACHMENTS.

**MILLFORD Wicker Sidecar**, good order; 70/-—Seen at Canal House, Marsworth, Tring. [2309]

**CORONET Sidecars**—Illustrated catalogue free upon request.—Booths Motorcycles, Portland Place, Halifax. [2309]

**CORONET Sidecars** from £9/15; special model for Harley-Davidson, enamelled French grey. [2309]

**CORONET Sidecars** from £9/15; special model for Indians, enamelled red. 28 in. tyre. [2309]

**CORONET Sidecars**; special coachbuilt model for lightweights, £9/15; illustrated list free. [2309]

**CORONET Sidecars** are made to suit any machine, and delivered from stock. [2309]

**CORONET Sidecars**—Send for illustrated catalogue from Booths Motorcycles, Portland Place, Halifax. [2309]

**SIDECAR Wheels**, lugs, mudguards, long lengths tubing; state requirements.—Booths Motorcycles, Halifax. [2309]

**SIDECAR Chassis**, complete with all fittings and tyre; £3.—Booths Motorcycles, Halifax. [2077]

**THE Willowbrook Co.**, Leicester, solicit your enquiries for sidecars of all descriptions. Write for illustrated catalogue. [0718]

**SPORTING Phoenix Torpedo**, brand new, still in crate; cost over £16, accept £12.—Bennett, 95, Well-meadow Rd., Catford. [X9985]

**SIDECAR Chassis**, new underslung, latest patterns, complete, less tyre and body; £4/5.—Firth, Wood-bridge Rd., Moseley, Birmingham. [2380]

**BASTONE'S** for Sidecars—New coachbuilt, complete with Michelin tyre, £9/15; also other models at clearance prices.—228, Pentonville Rd., King's Cross, London, N.1. [2372]

**PHENIX Sidecars**, new and second-hand; also several new stock soiled to clear, 100 complete sidecars always in stock; list free.—Phoenix Sidecars, 736, Holloway Rd., London. [2333]

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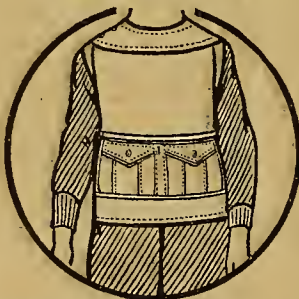
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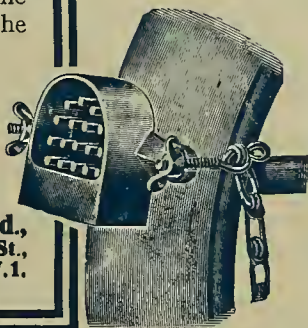
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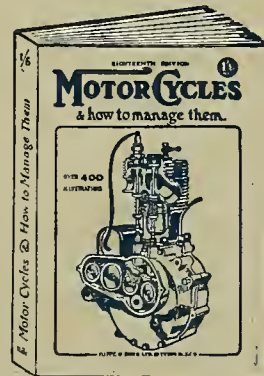
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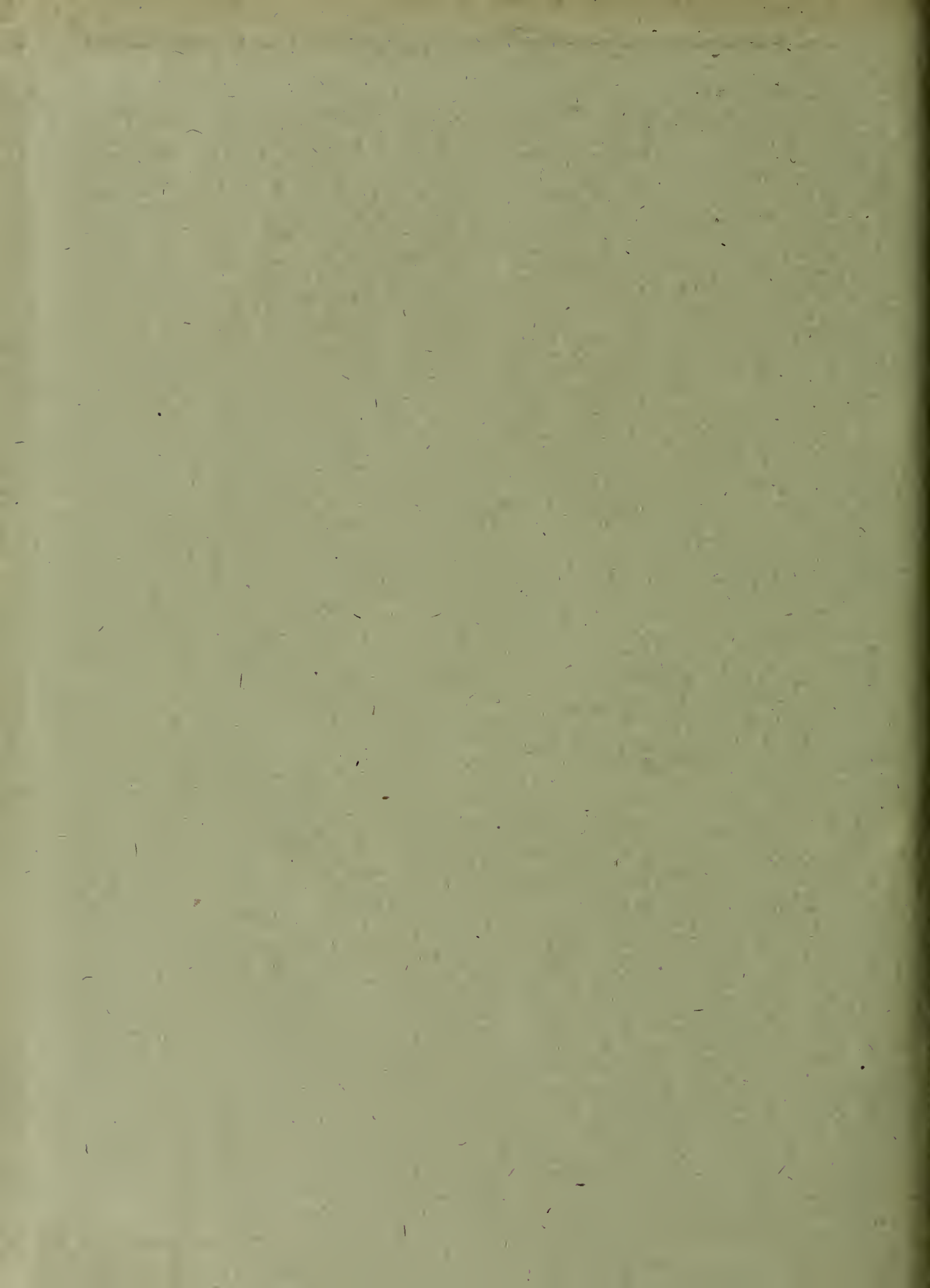














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